FUJITSU

SPARC Enterprise
T5440 Server

Service Manual

C120-E512-02EN

FUJITSU

SPARC Enterprise™ T5440 Server Service Manual

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Preface

This manual provides detailed procedures that describe the removal and replacement of replaceable parts in the SPARC Enterprise™ T5440 Server. This manual also includes information about the use and maintenance of the server. This document is written for technicians, system administrators, authorized service providers (ASPs), and users who have advanced experience troubleshooting and replacing hardware.

For Safe Operation

This manual contains important information regarding the use and handling of this product. Read this manual thoroughly. Pay special attention to the section "Notes on Safety" on page xix. Use the product according to the instructions and information available in this manual. Keep this manual handy for further reference.

Keep this manual handy for further reference. Fujitsu makes every effort to prevent users and bystanders from being injured or from suffering damage to their property. Use the product according to this manual.

Before You Read This Document

To fully use the information in this document, you must have thorough knowledge of the topics discussed in the *SPARC Enterprise T5440 Server Product Notes*.

Structure and Contents of This Manual

This manual is organized as described below:

- "Identifying Server Components" on page 1

  Provides an overview of the server, including major boards and components, as well as front and rear panel features.

- "Managing Faults" on page 9

  Describes the diagnostics that are available for monitoring and troubleshooting the server.

- "Preparing to Service the System" on page 59

  Describes the steps necessary to prepare the server for service.

- "Servicing Customer-Replaceable Units" on page 71

  Describes how to service customer-replaceable units (CRUs)

- "Servicing Field-Replaceable Units" on page 115

  Describes how to service field-replaceable units (FRUs)

- "Returning the Server to Operation" on page 149

  Describes how to bring the server back to operation after performing service procedures.

- "Performing Node Reconfiguration" on page 155

  Describes how to perform node reconfiguration.

- "Connector Pinouts" on page 167

  Contains pinout tables for all external connectors.

- "Server Components" on page 173

  Contains illustrations showing server components.

Related Documentation

The latest versions of all the SPARC Enterprise Series manuals are available at the following Web sites:

Global Site

(http://www.fujitsu.com/sparcenterprise/manual/)

Japanese Site

(http://primeserver.fujitsu.com/sparcenterprise/manual/)

Title	Description	Manual Code
SPARC Enterprise T5440 Server Getting Started Guide	Minimum steps to power on and boot the server for the first time	C120-E504
SPARC Enterprise T5440 Server Product Notes	Information about the latest product updates and issues	C120-E508
Important Safety Information for Hardware Systems	Safety information that is common to all SPARC Enterprise series servers	C120-E391
SPARC Enterprise T5440 Server Safety and Compliance Guide	Safety and compliance information that is specific to the server	C120-E509
SPARC Enterprise/ PRIMEQUEST Common Installation Planning Manual	Requirements and concepts of installation and facility planning for the setup of SPARC Enterprise and PRIMEQUEST	C120-H007
SPARC Enterprise T5440 Server Site Planning Guide	Server specifications for site planning	C120-H029
SPARC Enterprise T5440 Server Installation and Setup Guide	Detailed rackmounting, cabling, power on, and configuring information	C120-E510
SPARC Enterprise T5440 Server Service Manual	How to run diagnostics to troubleshoot the server, and how to remove and replace parts in the server	C120-E512
SPARC Enterprise T5440 Server Administration Guide	How to perform administrative tasks that are specific to the server	C120-E511
Integrated Lights Out Manager 2.0 User's Guide	Information that is common to all platforms managed by Integrated Lights Out Manager (ILOM) 2.0	C120-E474
Integrated Lights Out Manager 2.0 Supplement for SPARC Enterprise T5440 Server	How to use the ILOM 2.0 software on the server	C120-E513

Title	Description	Manual Code
Integrated Lights Out Manager 3.0 Concepts Guide	Information that describes ILOM 3.0 features and functionality	C120-E573
Integrated Lights Out Manager 3.0 Getting Started Guide	Information and procedures for network connection, logging in to ILOM 3.0 for the first time, and configuring a user account or a directory service	C120-E576
Integrated Lights Out Manager 3.0 Web Interface Procedures Guide	Information and procedures for accessing ILOM 3.0 functions using the ILOM web interface	C120-E574
Integrated Lights Out Manager 3.0 CLI Procedures Guide	Information and procedures for accessing ILOM 3.0 functions using the ILOM CLI	C120-E575
Integrated Lights Out Manager 3.0 SNMP and IPMI Procedure Guide	Information and procedures for accessing ILOM 3.0 functions using SNMP or IPMI management hosts	C120-E579
Integrated Lights Out Manager 3.x Feature Updates and Release Notes	Enhancements that have been made to ILOM firmware since the ILOM 3.0 release	C120-E600
Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server	How to use the ILOM 3.0 software on the server	C120-E587
External I/O Expansion Unit Installation and Service Manual	Procedures for installing the External I/O Expansion Unit on the SPARC Enterprise T5120/T5140/T5220/T5240/T5440 servers	C120-E543
External I/O Expansion Unit Product Notes	Important and late-breaking information about the External I/O Expansion Unit	C120-E544

Note – Product Notes are available on the website only. Please check for the recent update on your product.

UNIX Commands

This document might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at

  (http://docs.sun.com)

Text Conventions

Typeface*	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your .login file. Use ls -a to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% **su** Password:
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. To delete a file, type **rm** *filename*.

* The settings on your browser might differ from these settings.

Prompt Notations

The following prompt notations are used in this manual.

Shell	Prompt Notations
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#
ILOM service processor	->
ALOM compatibility shell	sc>
OpenBoot PROM firmware	ok

Conventions for Alert Messages

This manual uses the following conventions to show alert messages, which are intended to prevent injury to the user or bystanders as well as property damage, and important messages that are useful to the user.

Warning – This indicates a hazardous situation that could result in death or serious personal injury (potential hazard) if the user does not perform the procedure correctly.

Caution – This indicates a hazardous situation that could result in minor or moderate personal injury if the user does not perform the procedure correctly. This signal also indicates that damage to the product or other property may occur if the user does not perform the procedure correctly.

Caution – This indicates that surfaces are hot and might cause personal injury if touched. Avoid contact.

Caution – This indicates that hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

Tip – This indicates information that could help the user to use the product more effectively.

Alert Messages in the Text

An alert message in the text consists of a signal indicating an alert level followed by an alert statement. A space of one line precedes and follows an alert statement.

Caution – The following tasks regarding this product and the optional products provided from Fujitsu should only be performed by a certified service engineer. Users must not perform these tasks. Incorrect operation of these tasks may cause malfunction.

Also, important alert messages are shown in "Important Alert Messages" on page xix.

Notes on Safety

Important Alert Messages

This manual provides the following important alert signals:

Caution – This indicates a hazardous situation could result in minor or moderate personal injury if the user does not perform the procedure correctly. This signal also indicates that damage to the product or other property may occur if the user does not perform the procedure correctly.

Task	Warning
Maintenance	**Damage** Two people must dismount and carry the chassis. The weight of the server on extended slide rails can be enough to overturn an equipment rack. Before you begin, deploy the antitilt feature on your cabinet. The server weighs approximately 88 lb (40 kg). Two people are required to lift and mount the server into a rack enclosure when using the procedures in this chapter.

Caution – This indicates that hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

Task	Warning
Maintenance	**Electric shock** Never attempt to run the server with the covers removed. Hazardous voltage present. Because 3.3v standby power is always present in the system, you must unplug the power cords before accessing any cold-serviceable components.

Caution – This indicates that surfaces are hot and might cause personal injury if touched. Avoid contact.

Task	Warning
Maintenance	**Extremely hot** FB-DIMMs may be hot. Use caution when servicing FB-DIMMs.

Product Handling

Maintenance

Warning – Certain tasks in this manual should only be performed by a certified service engineer. User must not perform these tasks. Incorrect operation of these tasks may cause electric shock, injury, or fire.

- Installation and reinstallation of all components, and initial settings
- Removal of front, rear, or side covers
- Mounting/de-mounting of optional internal devices
- Plugging or unplugging of external interface cards
- Maintenance and inspections (repairing, and regular diagnosis and maintenance)

Caution – The following tasks regarding this product and the optional products provided from Fujitsu should only be performed by a certified service engineer. Users must not perform these tasks. Incorrect operation of these tasks may cause malfunction.

- Unpacking optional adapters and such packages delivered to the users
- Plugging or unplugging of external interface cards

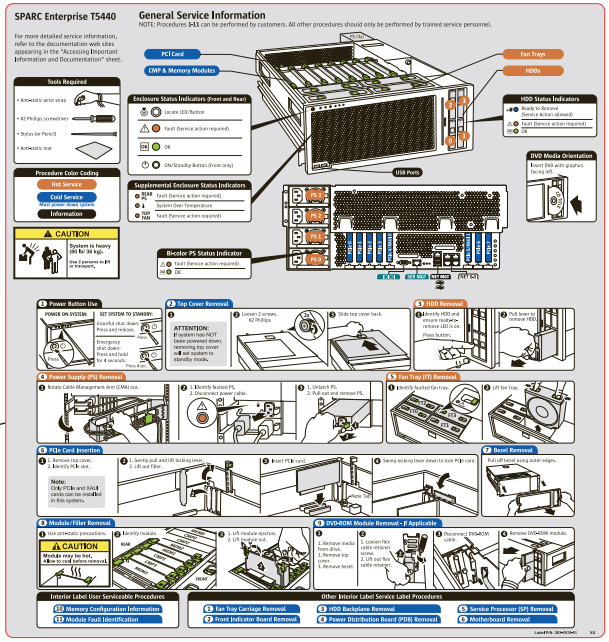
Remodeling/Rebuilding

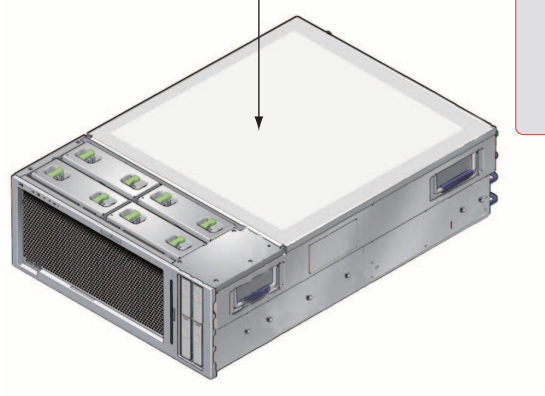
Caution – Do not make mechanical or electrical modifications to the equipment. Using this product after modifying or reproducing by overhaul may cause unexpected injury or damage to the property of the user or bystanders.

Alert Label

The following is a label attached to this product:

- Never peel off the label.
- The following label provides information to the users of this product.


SPARC Enterprise T5440
General Service Information
NOTE: Procedures 1-11 can be performed by customers. All other procedures should only be performed by trained service personnel.
For more detailed service information, refer to the documentation web sites appearing in the "Accessing Important Information and Documentation" sheet.
PCI Card
CMP & Memory Modules
Fan Trays
HDDs
Tools Required
Anti-static wrist strap
#2 Phillips screwdriver
Stylus (or Pencil)
Anti-static mat
Enclosure Status Indicators (Front and Rear)
Locate LED/Button
Fault (Service action required)
OK
ON/Standby Button (Front only)
HDD Status Indicators
Ready to Remove (Service Action allowed)
Fault (Service action required)
OK
Procedure Color Coding
Hot Service
Cold Service
Information
Supplemental Enclosure Status Indicators
Fault (Service action required)
System Over Temperature
Fault (Service action required)
DVD Media Orientation
Insert DVD with graphics facing left.
CAUTION
System is heavy (80 lb/ 36 kg). Use 2 persons to lift or transport.
Bi-color PS Status Indicator
Fault (Service action required)
OK
USB Ports
1 Power Button Use
2 Top Cover Removal
3 HDD Removal
4 Power Supply (PS) Removal
5 Fan Tray (FT) Removal
6 PCIe Card Insertion
7 Bezel Removal
8 Module/Filler Removal
9 DVD-ROM Module Removal – If Applicable
Interior Label User Serviceable Procedures
10 Memory Configuration Information
11 Module Fault Identification
Other Interior Label Service Label Procedures
1 Fan Tray Carriage Removal
2 Front Indicator Board Removal
3 HDD Backplane Removal
4 Power Distribution Board (PDB) Removal
5 Service Processor (SP) Removal
6 Motherboard Removal



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Identifying Server Components

This section provides an overview of the server, including major boards and components, as well as front and rear panel features.

Description	Links
Overview of the infrastructure boards and cables in the server	"Infrastructure Boards and Cables" on page 1
Overview of front panel features	"Front Panel Diagram" on page 3 "Front Panel LEDs" on page 4
Overview of rear panel features	"Rear Panel Diagram" on page 5 "Rear Panel LEDs" on page 7 "Ethernet Port LEDs" on page 8

Related Information

- "Server Components" on page 173

Infrastructure Boards and Cables

The SPARC Enterprise T5440 server is based on a 4U chassis.

The SPARC Enterprise T5440 server has the following boards installed in the chassis:

- **Motherboard** – The motherboard includes slots for up to four CMP modules and four memory modules, memory control subsystem, up to eight PCIe expansion slots, and a service processor slot. The motherboard also contains a top cover safety interlock ("kill") switch.

Note – 10-Gbit Ethernet XAUI cards are shared in Slots 4 and 5.

- **CMP module** – Each CMP module contains an UltraSPARC T2 Plus chip, slots for four FB-DIMMs, and associated DC-DC converters.

- **Memory module** – A memory module containing slots for an additional 12 FB-DIMMs is associated with each CMP module.
- **Service processor** – The service processor (ILOM) board controls the server power and monitors server power and environmental events. The service processor draws power from the server's 3.3V standby supply rail, which is available whenever the system is receiving main input power, even when the system is turned off.

  A removable IDPROM contains MAC addresses, host ID, and ILOM and OpenBoot PROM configuration data. When replacing the service processor, the IDPROM can be transferred to a new board to retain system configuration data.
- **Power supply backplane** – This board distributes main 12V power from the power supplies to the rest of the system. The power supply backplane is connected to the motherboard and the disk drive backplane via a flex cable. High voltage power is provided to the motherboard via a bus bar assembly.
- **Hard drive backplane** – This board includes the connectors for up to four hard drives. It is connected to the motherboard via a flex cable assembly.

  Each drive has its own Power/Activity, Fault, and Ready-to-Remove LEDs.
- **Front control panel** – This board connects directly to the motherboard, and serves as the interconnect for the front I/O board. It contains the front panel LEDs and the Power button.
- **Front I/O board** – This board connects to the front control panel interconnect. It contains two USB ports.
- **Flex cable assembly** – The flex cable assembly serves as the interconnect between the power supply backplane, motherboard, hard drive backplane, and DVD-ROM drive.
- **Power supply backplane I2C cable** – This cable transmits power supply status to the motherboard.

Related Information

- *SPARC Enterprise T5440 Server Site Planning Guide*.
- "Managing Faults" on page 9
- "Servicing Customer-Replaceable Units" on page 71
- "Servicing Field-Replaceable Units" on page 115

Front Panel Diagram

The server front panel contains a recessed system power button, system status and fault LEDs, Locator button and LED. The front panel also provides access to internal hard drives, the DVD-ROM drive (if equipped), and the two front USB ports.

FIGURE: Front Panel Features on page 3 shows front panel features on the SPARC Enterprise T5440 server. For a detailed description of front panel controls and LEDs, see "Front Panel LEDs" on page 4.

FIGURE: Front Panel Features

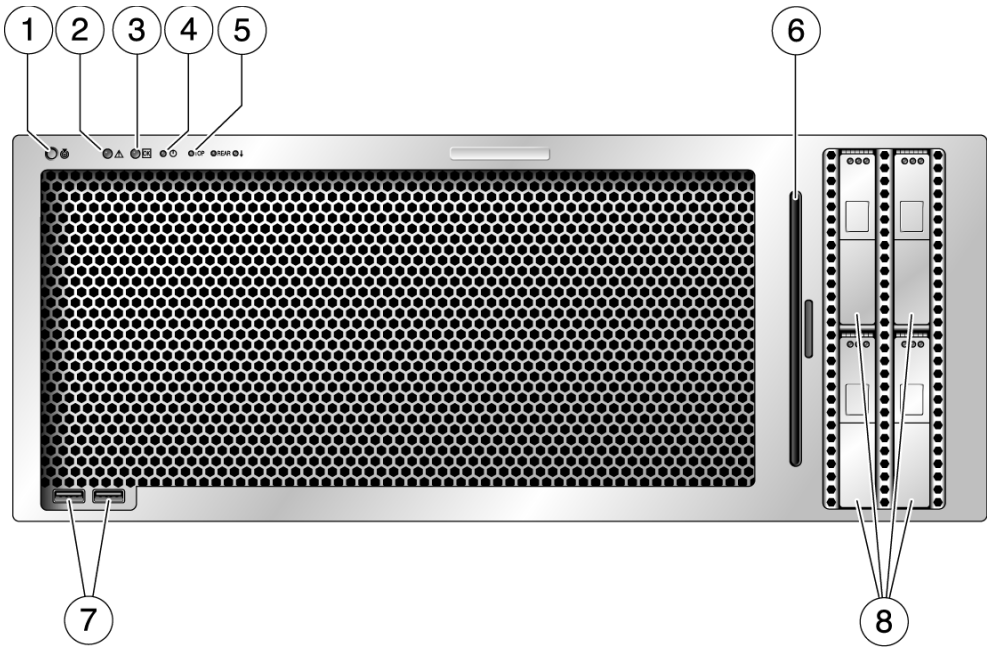


Figure Legend

1	Locator Button/LED	**5**	Component Fault LEDs
2	Service Required LED	**6**	DVD-ROM Drive
3	Power/OK LED	**7**	USB Ports
4	Power Button	**8**	Hard Drives

Related Information

- "Front Panel LEDs" on page 4

- "Rear Panel Diagram" on page 5
- "Servicing the Front Bezel" on page 115

Front Panel LEDs

See TABLE: Rear Panel System LEDs on page 7 for a description of the front panel system LEDs and controls.

TABLE: Front Panel LEDs and Controls

LED or Button	Icon	Description
Locator LED and button (white)		The Locator LED enables you to find a particular system. The LED is activated using one of the following methods: • The ALOM CMT command setlocator on. • The ILOM command `set /SYS/LOCATE value=Fast_Blink` • Manually press the Locator button to toggle the Locator LED on or off. This LED provides the following indications: • Off – Normal operating state. • Fast blink – System received a signal as a result of one of the methods previously mentioned, indicating that it is active.
Service Required LED (amber)		If on, indicates that service is required. POST and ILOM are two diagnostics tools that can detect a fault or failure resulting in this indication. The ILOM `show faulty` command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are lit in addition to the system Service Required LED.
Power OK LED (green)		Provides the following indications: • Off – Indicates that the system is not running in its normal state. System power might be off. The service processor might be running. • Steady on – Indicates that the system is powered on and is running in its normal operating state. No service actions are required. • Fast blink – Indicates the system is running at a minimum level in standby and is ready to be quickly returned to full function. The service processor is running. • Slow blink – Indicates that a normal transitory activity is taking place. Slow blinking could indicate that the system diagnostics are running, or that the system is booting.

TABLE: Front Panel LEDs and Controls *(Continued)*

LED or Button	Icon	Description
Power button		The recessed Power button toggles the system on or off. • If the system is powered off, press once to power on. • If the system is powered on, press once to initiate a graceful system shutdown. • If the system is powered on, press and hold for 4 seconds to initiate an emergency shutdown. For more information about powering on and powering off the system, see the *SPARC Enterprise T5440 Server Administration Guide*.
Fan Fault LED (amber)	TOP FAN	Provides the following operational fan indications: • Off – Indicates a steady state, no service action is required. • Steady on – Indicates that a fan failure event has been acknowledged and a service action is required on at least one of the fan modules.
Power Supply Fault LED (amber)	REAR PS	Provides the following operational PSU indications: • Off – Indicates a steady state, no service action is required. • Steady on – Indicates that a power supply failure event has been acknowledged and a service action is required on at least one PSU.
Overtemp LED (amber)		Provides the following operational temperature indications: • Off – Indicates a steady state, no service action is required. • Steady on – Indicates that a temperature failure event has been acknowledged and a service action is required.

Related Information

- "Front Panel Diagram" on page 3
- "Rear Panel LEDs" on page 7
- "Detecting Faults Using LEDs" on page 30

Rear Panel Diagram

The rear panel provides access to system I/O ports, PCIe ports, Gigabit Ethernet ports, power supplies, Locator button and LED, and system status LEDs.

FIGURE: Rear Panel Features on page 6 shows rear panel features on the SPARC Enterprise T5440 server. For more detailed information about ports and their uses, see the *SPARC Enterprise T5440 Server Installation and Setup Guide*. For a detailed description of PCIe slots, see "PCIe Device Identifiers" on page 96.

FIGURE: Rear Panel Features

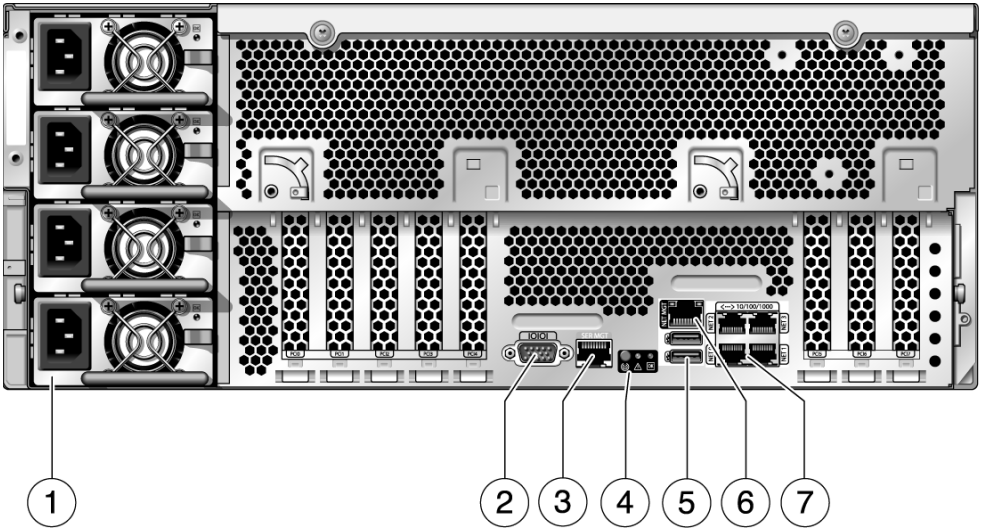


Figure Legend

1	Power supplies
2	Serial port
3	Serial management port
4	System status LEDs
5	USB ports
6	Network management port
7	Gigabit Ethernet ports

Related Information

- "Front Panel Diagram" on page 3
- "Rear Panel LEDs" on page 7
- "Ethernet Port LEDs" on page 8
- "Detecting Faults Using LEDs" on page 30

Rear Panel LEDs

TABLE: Rear Panel System LEDs on page 7 describes the rear panel system LEDs.

TABLE: Rear Panel System LEDs

LED	Icon	Description
Locator LED and button (white)		The Locator LED enables you to find a particular system. The LED is activated using one of the following methods: • The ALOM CMT command `setlocator on`. • The ILOM command `set /SYS/LOCATE value=Fast_Blink` • Manually press the Locator button to toggle the Locator LED on or off. This LED provides the following indications: • Off – Normal operating state. • Fast blink – System received a signal as a result of one of the methods previously mentioned, indicating that it is active.
Service Required LED (amber)		If on, indicates that service is required. POST and ILOM are two diagnostics tools that can detect a fault or failure resulting in this indication. The ILOM `show faulty` command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are lit in addition to the system Service Required LED.
Power OK LED (green)		Provides the following indications: • Off – Indicates that the system is not running in its normal state. System power might be off. The service processor might be running. • Steady on – Indicates that the system is powered on and is running in its normal operating state. No service actions are required. • Fast blink – Indicates the system is running at a minimum level in standby and is ready to be quickly returned to full function. The service processor is running. • Slow blink – Indicates that a normal transitory activity is taking place. Slow blinking could indicate the system diagnostics are running, or that the system is booting.

Related Information

- "Rear Panel Diagram" on page 5
- "Ethernet Port LEDs" on page 8
- "Detecting Faults Using LEDs" on page 30

Ethernet Port LEDs

The service processor network management port and the four 10/100/1000 Mbps Ethernet ports each have two LEDs, as described in TABLE: Ethernet Port LEDs on page 8.

TABLE: Ethernet Port LEDs

LED	Color	Description
Left LED	Amber or green	Speed indicator: • Amber on – The link is operating as a Gigabit connection (1000-Mbps).* • Green on – The link is operating as a 100-Mbps connection. • Off – The link is operating as a 10-Mbps connection.
Right LED	Green	Link/Activity indicator: • Steady on – A link is established. • Blinking – There is activity on this port. • Off – No link is established.

* The NET MGT port only operates in 100-Mbps or 10-Mbps so the speed indicator LED will be green or off (never amber).

Related Information

- "Rear Panel Diagram" on page 5
- "Rear Panel LEDs" on page 7
- "Detecting Faults Using LEDs" on page 30

Managing Faults

These topics describe the diagnostics tools that are available for monitoring and troubleshooting the server.

This chapter is intended for technicians, service personnel, and system administrators who service and repair computer systems.

Topic	Links
Background: fault detection methodology	"Understanding Fault Handling Options" on page 9
Configuring and using the service processor	"Connecting to the Service Processor" on page 22
Displaying system configuration information with the service processor	"Displaying FRU Information with ILOM" on page 24
Configuring POST for diagnostic purposes	"Controlling How POST Runs" on page 26
Detecting system faults	"Detecting Faults" on page 30
Clearing system faults	"Clearing Faults" on page 47
Disabling faulty components to allow the system to run in a degraded state	"Disabling Faulty Components" on page 50
ILOM commands and equivalent ALOM CMT commands	"ILOM-to-ALOM CMT Command Reference" on page 53

Understanding Fault Handling Options

Server Diagnostics Overview

You can use a variety of diagnostic tools, commands, and indicators to monitor and troubleshoot a server:

- **LEDs** – Provide a quick visual notification of the status of the server and of some of the FRUs.
- **ILOM firmware** – This system firmware runs on the service processor. In addition to providing the interface between the hardware and OS, ILOM also tracks and reports the health of key server components. ILOM works closely with POST and Solaris Operating System (Solaris OS) Predictive Self-Healing technology to keep the system up and running even when there is a faulty component.
- **Power-on self-test (POST)** – POST performs diagnostics on system components upon system reset to ensure the integrity of those components. POST is configurable and works with ILOM to take faulty components offline if needed.
- **Solaris OS Predictive Self-Healing (PSH)** – This technology continuously monitors the health of the processor and memory, and works with ILOM to take a faulty component offline if needed. The Predictive Self-Healing technology enables systems to accurately predict component failures and mitigate many serious problems before they occur.
- **Log files and console messages** – Solaris OS log files and ILOM system event log can be accessed and displayed on the device of your choice.
- **SunVTS software** – The SunVTS software exercises the system, provides hardware validation, and discloses possible faulty components with recommendations for repair.

The LEDs, ILOM, Solaris OS PSH, and many of the log files and console messages are integrated. For example, a fault detected by the Solaris software displays the fault, logs it, and passes information to ILOM where it is logged. Depending on the fault, one or more LEDs might be illuminated.

The diagnostic flowchart in TABLE: Diagnostic Flowchart Actions on page 12 and TABLE: ILOM Parameters Used for POST Configuration on page 26 describes an approach for using the server diagnostics to identify a faulty field-replaceable unit (FRU). The diagnostics you use, and the order in which you use them, depend on the nature of the problem you are troubleshooting. So you might perform some actions and not others.

Before referring to the flowchart, perform some basic troubleshooting tasks:

- Verify that the server was installed properly.
- Visually inspect cables and power.
- (Optional) Perform a reset of the server.

Related Information

- "Diagnostic Flowchart" on page 11
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*

Diagnostic Flowchart

FIGURE: Diagnostic Flowchart on page 11 is a flowchart of the diagnostics available to troubleshoot faulty hardware. TABLE: ILOM Parameters Used for POST Configuration on page 26 has more information about each diagnostic in this chapter.

FIGURE: Diagnostic Flowchart

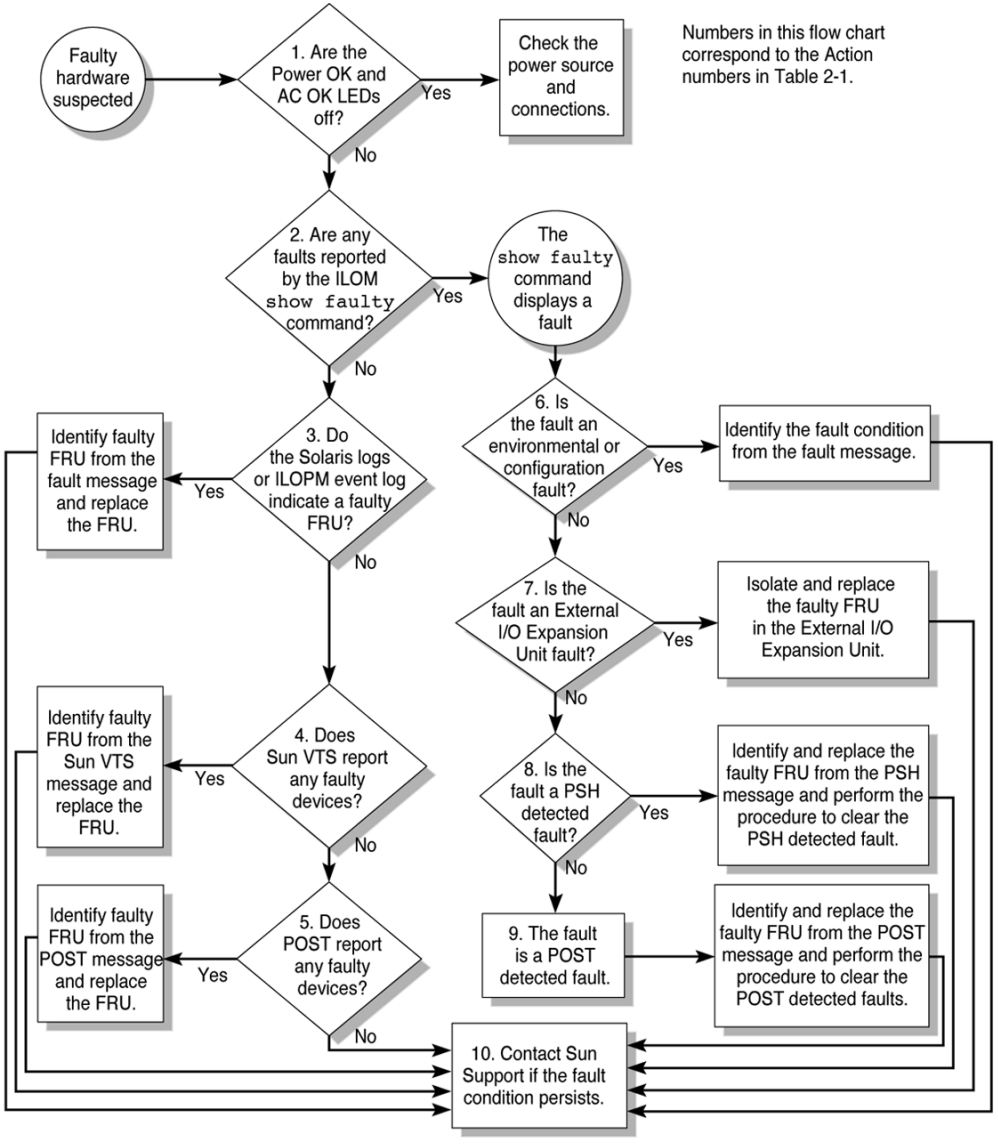

Faulty hardware suspected
1. Are the Power OK and AC OK LEDs off?
Yes
Check the power source and connections.
No
Numbers in this flow chart correspond to the Action numbers in Table 2-1.
2. Are any faults reported by the ILOM show faulty command?
Yes
The show faulty command displays a fault
No
3. Do the Solaris logs or ILOPM event log indicate a faulty FRU?
Yes
Identify faulty FRU from the fault message and replace the FRU.
No
6. Is the fault an environmental or configuration fault?
Yes
Identify the fault condition from the fault message.
No
7. Is the fault an External I/O Expansion Unit fault?
Yes
Isolate and replace the faulty FRU in the External I/O Expansion Unit.
No
4. Does Sun VTS report any faulty devices?
Yes
Identify faulty FRU from the Sun VTS message and replace the FRU.
No
8. Is the fault a PSH detected fault?
Yes
Identify and replace the faulty FRU from the PSH message and perform the procedure to clear the PSH detected fault.
No
5. Does POST report any faulty devices?
Yes
Identify faulty FRU from the POST message and replace the FRU.
No
9. The fault is a POST detected fault.
Identify and replace the faulty FRU from the POST message and perform the procedure to clear the POST detected faults.
10. Contact Sun Support if the fault condition persists.

TABLE: Diagnostic Flowchart Actions

Action No.	Diagnostic Action	Resulting Action	For more information
1.	Check Power OK and AC Present LEDs on the server.	The Power OK LED is located on the front and rear of the chassis. The AC Present LED is located on the rear of the server on each power supply. If these LEDs are not on, check the power source and power connections to the server.	"Detecting Faults" on page 30
2.	Run the ILOM `show faulty` command to check for faults.	The `show faulty` command displays the following kinds of faults: • Environmental faults • External I/O Expansion Unit faults • Solaris Predictive Self-Healing (PSH) detected faults • POST-detected faults Faulty FRUs are identified in fault messages using the FRU name. **Note -** If the ILOM `show faulty` output includes an error string such as `Ext sensor` or `Ext FRU`, it indicates a fault in the External I/O Expansion Unit.	"Detect Faults Using the ILOM `show faulty` Command" on page 33
3.	Check the Solaris log files and ILOM system event log for fault information.	The Solaris log files and the ILOM system event log record system events, and provide information about faults. • Browse the ILOM system event log for *major* or *critical* events. Some problems are logged in the event log but not added to the `show faulty` list • If system messages indicate a faulty device, replace the FRU. • To obtain more diagnostic information, go to Action No. 4	"Detecting Faults Using Solaris OS Files and Commands" on page 35
4.	Run SunVTS software.	SunVTS is an application you can run to exercise and diagnose FRUs. To run SunVTS, the server must be running the Solaris OS. • If SunVTS reports a faulty device, replace the FRU. • If SunVTS does not report a faulty device, go to Action No. 5.	"Detecting Faults Using SunVTS Software" on page 38

TABLE: Diagnostic Flowchart Actions *(Continued)*

Action No.	Diagnostic Action	Resulting Action	For more information
5.	Run POST.	POST performs basic tests of the server components and reports faulty FRUs.	"Detecting Faults Using POST" on page 42 TABLE: System Faults and Fault LED States on page 31, TABLE: ALOM CMT Parameters and POST Modes on page 56
6.	Determine if the fault is an environmental or configuration fault.	Determine if the fault is an environmental fault or a configuration fault. If the fault listed by the `show faulty` command displays a temperature or voltage fault, then the fault is an environmental fault. Environmental faults can be caused by faulty FRUs (power supply or fan), or by environmental conditions such as when computer room ambient temperature is too high, or the server airflow is blocked. When the environmental condition is corrected, the fault will automatically clear. If the fault indicates that a fan or power supply is bad, you can perform a hot-swap of the FRU. You can also use the fault LEDs on the server to identify the faulty FRU (fans and power supplies). If the FRU displayed by the `show faulty` command is `/SYS`, the fault is a configuration problem. `/SYS` indicates no faulty FRU has been diagnosed, but there is a problem with the system configuration.	"Detecting Faults Using ILOM `show faulty` Command" on page 32 "Detecting Faults" on page 30
7.	Determine if the fault was detected in the External I/O Expansion Unit.	Problems detected in the External I/O Expansion Unit include the text string `Ext FRU` or `Ext Sensor` at the beginning of the fault description.	"Detecting Faults Using ILOM `show faulty` Command" on page 32 "Clear Faults Detected in the External I/O Expansion Unit" on page 50

TABLE: Diagnostic Flowchart Actions *(Continued)*

Action No.	Diagnostic Action	Resulting Action	For more information
8.	Determine if the fault was detected by PSH.	If the fault displayed included a *uuid* and *sunw-msg-id* property, the fault was detected by the Solaris Predictive Self-Healing software. If the fault is a PSH-detected fault, refer to the PSH Knowledge Article web site for additional information. The Knowledge Article for the fault is located at the following link: `(http://www.sun.com/msg/)`*message-ID* where *message-ID* is the value of the *sunw-msg-id* property displayed by the `show faulty` command. After the FRU is replaced, perform the procedure to clear PSH-detected faults.	"Identifying Faults Detected by PSH" on page 44 "Clear Faults Detected by PSH" on page 49
9.	Determine if the fault was detected by POST.	POST performs basic tests of the server components and reports faulty FRUs. When POST detects a faulty FRU, it logs the fault and if possible, takes the FRU offline. POST detected FRUs display the following text in the fault message: `Forced fail` *reason* In a POST fault message, *reason* is the name of the power-on routine that detected the failure.	"POST Fault Management Overview" on page 19 "Clear Faults Detected During POST" on page 48
10.	Contact technical support.	The majority of hardware faults are detected by the server's diagnostics. In rare cases a problem might require additional troubleshooting. If you are unable to determine the cause of the problem, contact your service representative for support.	"Obtain the Chassis Serial Number" on page 62

Related Information

- "Server Diagnostics Overview" on page 9
- *SPARC Enterprise T5440 Server Administration Guide*

Options for Accessing the Service Processor

There are three methods of interacting with the service processor:

- Integrated Lights Out Manager (ILOM) shell (default) – Available via the System Management Port and the Network Management Port.
- ILOM browser interface (BI) – Documented in the *Integrated Lights Out Manager 3.0 Web Interface Procedures Guide*.
- ALOM CMT compatibility shell – Legacy shell emulation of ALOM CMT.

The code examples in this document depict use of the ILOM shell.

Note – Multiple service processor accounts can be active concurrently. A user can be logged in under one account using the ILOM shell, and another account using the ALOM CMT shell.

Related Information

- "Diagnostic Flowchart" on page 11
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*
- *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server*

ILOM Overview

The Integrated Lights Out Manager (ILOM) firmware runs on the service processor in the server, enabling you to remotely manage and administer your server.

ILOM enables you to remotely run diagnostics such as power-on self-test (POST), that would otherwise require physical proximity to the server's serial port. You can also configure ILOM to send email alerts of hardware failures, hardware warnings, and other events related to the server or to ILOM.

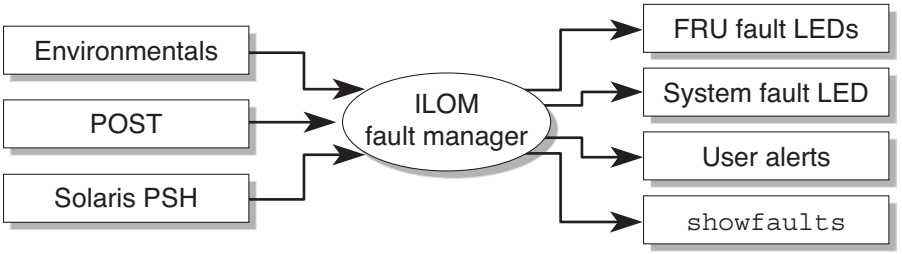
The service processor runs independently of the server, using the server's standby power. Therefore, ILOM firmware and software continue to function when the server OS goes offline or when the server is powered off.

Note – Refer to the *Integrated Lights Out Manager 3.0 Concepts Guide* for comprehensive ILOM information.

Faults detected by ILOM, POST, the Solaris Predictive Self-Healing (PSH) technology, and the External I/O Expansion Unit (if attached) are forwarded to ILOM for fault handling (FIGURE: ILOM Fault Management on page 16).

In the event of a system fault, ILOM ensures that the Service Required LED is lit, FRUID PROMs are updated, the fault is logged, and alerts are displayed. Faulty FRUs are identified in fault messages using the FRU name.

FIGURE: ILOM Fault Management



The service processor can detect when a fault is no longer present and clears the fault in several ways:

- Fault recovery – The system automatically detects that the fault condition is no longer present. The service processor extinguishes the Service Required LED and updates the FRU's PROM, indicating that the fault is no longer present.
- Fault repair – The fault has been repaired by human intervention. In most cases, the service processor detects the repair and extinguishes the Service Required LED. If the service processor does not perform these actions, you must perform these tasks manually by setting the ILOM *component_state* or *fault_state* of the faulted component.

The service processor can detect the removal of a FRU, in many cases even if the FRU is removed while the service processor is powered off (for example, if the system power cables are unplugged during service procedures). This function enables ILOM to know that a fault, diagnosed to a specific FRU, has been repaired.

Note – ILOM does not automatically detect hard drive replacement.

Many environmental faults can automatically recover. A temperature that is exceeding a threshold might return to normal limits. An unplugged power supply can be plugged in, and so on. Recovery of environmental faults is automatically detected.

Note – No ILOM command is needed to manually repair an environmental fault.

The Solaris Predictive Self-Healing technology does not monitor the hard drive for faults. As a result, the service processor does not recognize hard drive faults, and will not light the fault LEDs on either the chassis or the hard drive itself. Use the Solaris message files to view hard drive faults.

Related Information

- "Diagnostic Flowchart" on page 11

- "Detecting Faults Using LEDs" on page 30
- "Detecting Faults Using Solaris OS Files and Commands" on page 35
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*
- *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server*

ALOM CMT Compatibility Shell Overview

The default shell for the service processor is the ILOM shell. However, you can use the ALOM CMT compatibility shell to emulate the ALOM CMT interface supported on the previous generation of CMT servers. Using the ALOM CMT compatibility shell (with a few exceptions) you can use commands that resemble the commands of ALOM CMT.

The service processor sends alerts to all ALOM CMT users that are logged in, sends the alert through email to a configured email address, and writes the event to the ILOM event log. The ILOM event log is also available using the ALOM CMT compatibility shell.

See the *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server* for comparisons between the ILOM CLI and the ALOM CMT compatibility CLI, and for instructions for adding an ALOM-CMT account.

Related Information

- "Diagnostic Flowchart" on page 11
- "Detecting Faults Using LEDs" on page 30
- "ILOM-to-ALOM CMT Command Reference" on page 53
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*
- *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server*

Solaris Predictive Self-Healing Overview

The Solaris Predictive Self-Healing (PSH) technology enables the server to diagnose problems while the Solaris OS is running, and mitigate many problems before they negatively affect operations.

The Solaris OS uses the Fault Manager daemon, `fmd` (1M), which starts at boot time and runs in the background to monitor the system. If a component generates an error, the daemon handles the error by correlating the error with data from previous errors and other related information to diagnose the problem. Once diagnosed, the Fault Manager daemon assigns the problem a Universal Unique Identifier (UUID) that distinguishes the problem across any set of systems. When possible, the Fault Manager daemon initiates steps to self-heal the failed component and take the component offline. The daemon also logs the fault to the `syslogd` daemon and provides a fault notification with a message ID (MSGID). You can use the message ID to get additional information about the problem from the knowledge article database.

The Predictive Self-Healing technology covers the following server components:

- UltraSPARC T2 Plus multicore processor
- Memory
- I/O subsystem

The PSH console message provides the following information about each detected fault:

- Type
- Severity
- Description
- Automated response
- Impact
- Suggested action for system administrator

Related Information

- "Diagnostic Flowchart" on page 11
- "Identifying Faults Detected by PSH" on page 44
- *SPARC Enterprise T5440 Server Administration Guide*

SunVTS Overview

Sometimes a server exhibits a problem that cannot be isolated definitively to a particular hardware or software component. In such cases, it might be useful to run a diagnostic tool that stresses the system by continuously running a comprehensive battery of tests. SunVTS software is provided for this purpose.

Related Information

- "Diagnostic Flowchart" on page 11

- "SunVTS Software Packages" on page 41
- "Useful SunVTS Tests" on page 42
- *SPARC Enterprise T5440 Server Administration Guide*

POST Fault Management Overview

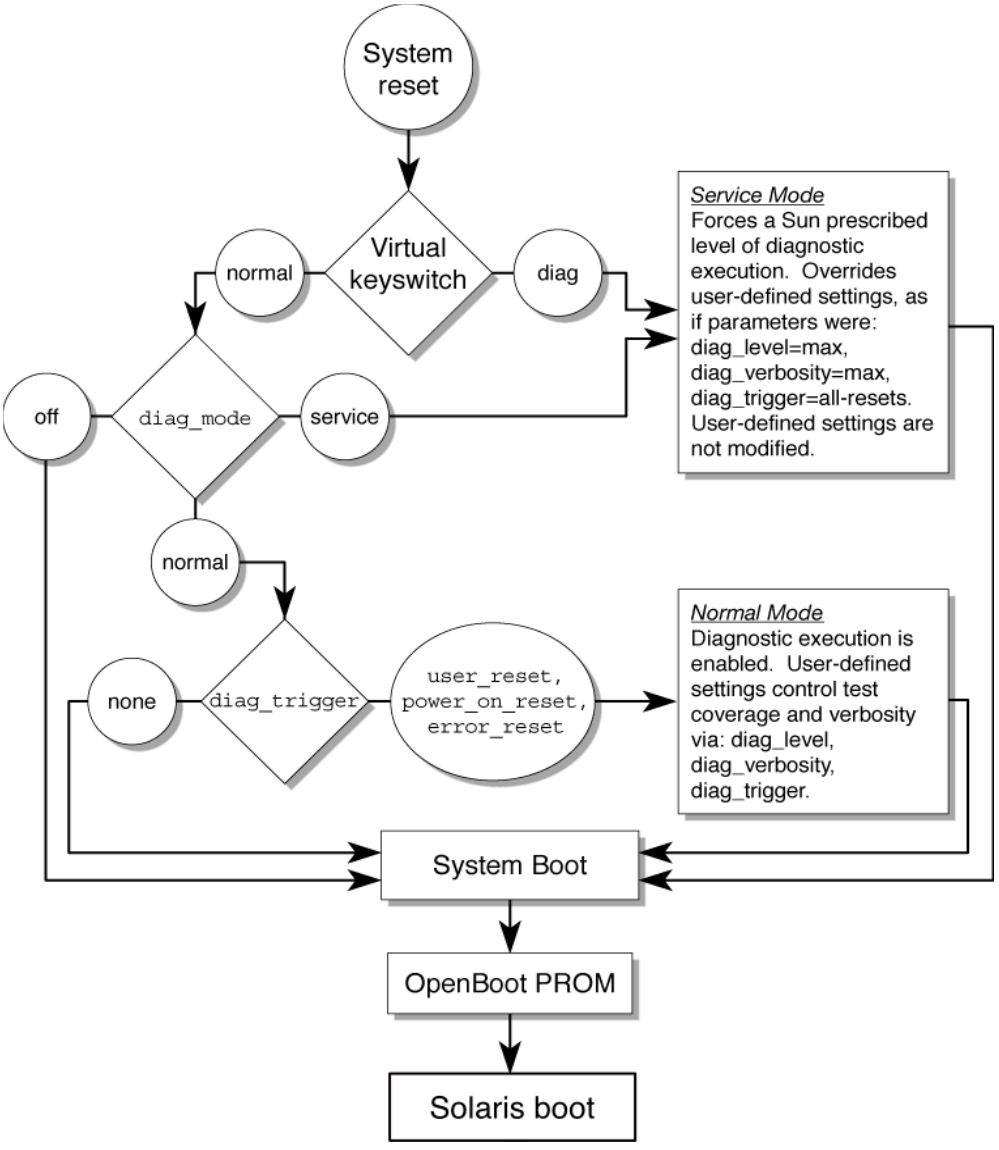
Power-on self-test (POST) is a group of PROM-based tests that run when the server is powered on or reset. POST checks the basic integrity of the critical hardware components in the server (CMP, memory, and I/O subsystem).

POST tests critical hardware components to verify functionality before the system boots and accesses software. If POST detects a faulty component, the component is disabled automatically, preventing faulty hardware from potentially harming any software. If the system is capable of running without the disabled component, the system will boot when POST is complete. For example, if one of the processor cores is deemed faulty by POST, the core will be disabled. The system will boot and run using the remaining cores.

You can use POST as an initial diagnostic tool for the system hardware. In this case, configure POST to run in maximum mode (`diag_mode=service`, `setkeyswitch=diag`, `diag_level=max`) for thorough test coverage and verbose output.

POST Fault Management Flowchart

FIGURE: Flowchart of Variables for POST Configuration



Related Information

- "Diagnostic Flowchart" on page 11

- "Detecting Faults Using POST" on page 42
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*

Memory Fault Handling Overview

A variety of features play a role in how the memory subsystem is configured and how memory faults are handled. Understanding the underlying features helps you identify and repair memory problems. This section describes how the server deals with memory faults.

Note – For memory configuration information, see "Supported FB-DIMM Configurations" on page 110.

The server uses advanced ECC technology that corrects up to 4-bits in error on nibble boundaries, as long as the bits are all in the same DRAM. On 4 GB FB-DIMMs, if a DRAM fails, the DIMM continues to function.

The following server features independently manage memory faults:

- **POST** – Based on ILOM configuration variables, POST runs when the server is powered on.

  For correctable memory errors (CEs), POST forwards the error to the Solaris Predictive Self-Healing (PSH) daemon for error handling. If an uncorrectable memory fault is detected, POST displays the fault with the device name of the faulty FB-DIMMs, and logs the fault. POST then disables the faulty FB-DIMMs. Depending on the memory configuration and the location of the faulty FB-DIMM, POST disables half of physical memory in the system, or half the physical memory and half the processor threads. When this offlining process occurs in normal operation, you must replace the faulty FB-DIMMs based on the fault message and enable the disabled FB-DIMMs with the ILOM command `set` *device* `component_state=enabled` where *device* is the name of the FB-DIMM being enabled (for example, `set /SYS/MB/CPU0/CMP0/BR0/CH0/D0 component_state=enabled`).

- Solaris Predictive Self-Healing (PSH) technology – A feature of the Solaris OS, PSH uses the Fault Manager daemon (`fmd`) to watch for various kinds of faults. When a fault occurs, the fault is assigned a unique fault ID (UUID), and logged. PSH reports the fault and identifies the locations of the faulty FB-DIMMs.

If you suspect that the server has a memory problem, follow the flowchart (see FIGURE: Diagnostic Flowchart on page 11). Run the ILOM `show faulty` command. The `show faulty` command lists memory faults and lists the specific FB-DIMMs that are associated with the fault.

Note – You can use the FB-DIMM DIAG buttons on the CMP module and memory module to identify faulty FB-DIMMs. See "FB-DIMM Fault Button Locations" on page 113.

Once you identify which FB-DIMMs you want to replace, see "Servicing FB-DIMMs" on page 104 for FB-DIMM removal and replacement instructions. You must perform the instructions in that section to clear the faults and enable the replaced FB-DIMMs.

Related Information

- "Controlling How POST Runs" on page 26
- "Displaying FRU Information with ILOM" on page 24
- "Detecting Faults" on page 30
- "Servicing FB-DIMMs" on page 104

Connecting to the Service Processor

Before you can run ILOM commands, you must connect to the service processor. There are several ways to connect to the service processor.

Topic	Links
Connect an ASCII terminal directly to the serial management port.	*SPARC Enterprise T5440 Server Installation and Setup Guide*
Use the `ssh` command to connect to service processor through an Ethernet connection on the network management port.	*SPARC Enterprise T5440 Server Installation and Setup Guide*
Switch from the system console to the service processor	"Switch From the System Console to the Service Processor (ILOM or ALOM CMT Compatibility Shell)" on page 23
Switch from the service processor to the system console	"Switch From ILOM to the System Console" on page 23 "Switch From the ALOM CMT Compatibility Shell to the System Console" on page 24

Related Information

- "Diagnostic Flowchart" on page 11

- "Switch From the System Console to the Service Processor (ILOM or ALOM CMT Compatibility Shell)" on page 23
- "Switch From ILOM to the System Console" on page 23
- "Switch From the ALOM CMT Compatibility Shell to the System Console" on page 24
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*

▼ Switch From the System Console to the Service Processor (ILOM or ALOM CMT Compatibility Shell)

- **To switch from the system console to the service processor prompt, type `#.` (Hash-Period).**

```
# #.
->
```

▼ Switch From ILOM to the System Console

- **From the ILOM `->` prompt, type `start /SP/console`.**

```
-> start /SP/console
#
```

▼ Switch From the ALOM CMT Compatibility Shell to the System Console

- **From the ALOM-CMT `sc>` prompt, type `console`.**

```
sc> console
#
```

Displaying FRU Information with ILOM

▼ Display System Components With the ILOM `show components` Command

The `show components` command displays the system components (asrkeys) and reports their status.

- **At the `->` prompt, type the `show components` command.**

  CODE EXAMPLE: Output of the `show components` Command With No Disabled Components on page 24 shows partial output with no disabled components.

  CODE EXAMPLE: Output of the `show components` Command Showing Disabled Components on page 25 shows the `showcomponents` command output with a component disabled.

CODE EXAMPLE: Output of the `show components` Command With No Disabled Components

```
-> show components
Target              | Property              | Value
--------------------+-----------------------+------------------------------
/SYS/MB/PCIE0       | component_state       | Enabled
/SYS/MB/PCIE3/      | component_state       | Enabled
/SYS/MB/PCIE1/      | component_state       | Enabled
/SYS/MB/PCIE4/      | component_state       | Enabled
/SYS/MB/PCIE2/      | component_state       | Enabled
/SYS/MB/PCIE5/      | component_state       | Enabled
/SYS/MB/NET0        | component_state       | Enabled
/SYS/MB/NET1        | component_state       | Enabled
/SYS/MB/NET2        | component_state       | Enabled
/SYS/MB/NET3        | component_state       | Enabled
/SYS/MB/PCIE        | component_state       | Enabled
```

CODE EXAMPLE: Output of the `show components` Command Showing Disabled Components

```
-> show components
Target              | Property              | Value
--------------------+-----------------------+------------------------------
/SYS/MB/PCIE0/      | component_state       | Enabled
/SYS/MB/PCIE3/      | component_state       | Disabled
/SYS/MB/PCIE1/      | component_state       | Enabled
/SYS/MB/PCIE4/      | component_state       | Enabled
```

CODE EXAMPLE: Output of the `show components` Command Showing Disabled Components *(Continued)*

```
/SYS/MB/PCIE2/      | component_state       | Enabled
/SYS/MB/PCIE5/      | component_state       | Enabled
/SYS/MB/NET0        | component_state       | Enabled
/SYS/MB/NET1        | component_state       | Enabled
/SYS/MB/NET2        | component_state       | Enabled
/SYS/MB/NET3        | component_state       | Enabled
/SYS/MB/PCIE        | component_state       | Enabled
```

▼ Display Individual Component Information With the ILOM `show` Command

Use the `show` command to display information about individual components in the server.

- **At the `->` prompt, enter the `show` command.**

  In CODE EXAMPLE: `show` Command Output on page 25, the `show` command is used to get information about a memory module (FB-DIMM).

CODE EXAMPLE: `show` Command Output

```
-> show /SYS/MB/CPU0/CMP0/BR1/CH0/D0

/SYS/MB/CPU0/CMP0/BR1/CH0/D0
   Targets:
       R0
       R1
       SEEPROM
       SERVICE
       PRSNT
       T_AMB

   Properties:
       type = DIMM
       component_state = Enabled
       fru_name = 1024MB DDR2 SDRAM FB-DIMM 333 (PC2 5300)
       fru_description = FBDIMM 1024 Mbyte
       fru_manufacturer = Micron Technology
       fru_version = FFFFFF
       fru_part_number = 18HF12872FD667D6D4
       fru_serial_number = d81813ce
       fault_state = OK
       clear_fault_action = (none)
```

CODE EXAMPLE: `show` Command Output *(Continued)*

```
    Commands:
        cd
        show
```

Controlling How POST Runs

The server can be configured for normal, extensive, or no POST execution. You can also control the level of tests that run, the amount of POST output that is displayed, and which reset events trigger POST by using ILOM command variables.

The `keyswitch_state` parameter, when set to `diag`, overrides all the other ILOM POST variables.

TABLE: ILOM Parameters Used for POST Configuration on page 26 lists the ILOM variables used to configure POST. FIGURE: Flowchart of Variables for POST Configuration on page 20 shows how the variables work together.

TABLE: ILOM Parameters Used for POST Configuration

Parameter	Values	Description
`keyswitch_mode`	`normal`	The system can power on and run POST (based on the other parameter settings). For details see FIGURE: Flowchart of Variables for POST Configuration on page 20. This parameter overrides all other commands.
	`diag`	The system runs POST based on predetermined settings.
	`stby`	The system cannot power on.
	`locked`	The system can power on and run POST, but no flash updates can be made.
`diag_mode`	`off`	POST does not run.
	`normal`	Runs POST according to `diag_level` value.
	`service`	Runs POST with preset values for `diag_level` and `diag_verbosity`.
`diag_level`	`max`	If `diag_mode` = `normal`, runs all the minimum tests plus extensive processor and memory tests.
	`min`	If `diag_mode` = `normal`, runs minimum set of tests.

TABLE: ILOM Parameters Used for POST Configuration *(Continued)*

Parameter	Values	Description
`diag_trigger`	`none`	Does not run POST on reset.
	`user_reset`	Runs POST upon user initiated resets.
	`power_on_reset`	Only runs POST for the first power on. This option is the default.
	`error_reset`	Runs POST if fatal errors are detected.
	`all_resets`	Runs POST after any reset.
`diag_verbosity`	`none`	No POST output is displayed.
	`min`	POST output displays functional tests with a banner and pinwheel.
	`normal`	POST output displays all test and informational messages.
	`max`	POST displays all test, informational, and some debugging messages.

Related Information

- "Diagnostic Flowchart" on page 11
- "Change POST Parameters" on page 28
- "Run POST in Maximum Mode" on page 28
- "Detecting Faults Using POST" on page 42
- "Clear Faults Detected During POST" on page 48
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*

▼ Change POST Parameters

1. **Access the ILOM prompt.**

   See "Connecting to the Service Processor" on page 22.

2. **Use the ILOM commands to change the POST parameters.**

   Refer to TABLE: System Faults and Fault LED States on page 31 for a list of ILOM POST parameters and their values.

   The `set /SYS keyswitch_state` command sets the virtual keyswitch parameter. For example:

```
-> set /SYS keyswitch_state=Diag
Set 'keyswitch_state' to 'Diag'
```

   To change individual POST parameters, you must first set the `keyswitch_state` parameter to `normal`. For example:

```
-> set /SYS keyswitch_state=Normal
Set 'ketswitch_state' to 'Normal'
-> set /HOST/diag property=Min
```

▼ Run POST in Maximum Mode

This procedure describes how to run POST when you want maximum testing, as in the case when you are troubleshooting a server, or verifying a hardware upgrade or repair.

1. **Access the ILOM prompt.**

   See "Connecting to the Service Processor" on page 22.

2. **Set the virtual keyswitch to `diag` so that POST will run in service mode.**

```
-> set /SYS/keyswitch_state=Diag
Set 'keyswitch_state' to 'Diag'
```

3. **Reset the system so that POST runs.**

   There are several ways to initiate a reset. CODE EXAMPLE: Initiating POST With a Power Cycle on page 29 shows a reset using a power cycle command sequence. For other methods, refer to the *SPARC Enterprise T5440 Server Administration Guide*.

Note – The server takes about one minute to power off. Use the `show /HOST` command to determine when the host has been powered off. The console will display `status=Powered Off`

---

4. **Switch to the system console to view the POST output:**

```
-> start /SP/console
```

If no faults were detected, the system will boot.

CODE EXAMPLE: POST Output (Abridged) on page 29 depicts abridged POST output.

CODE EXAMPLE: Initiating POST With a Power Cycle

```
-> stop /SYS
Are you sure you want to stop /SYS (y/n)? y
Stopping /SYS
-> start /SYS
Are you sure you want to start /SYS (y/n)? y
Starting /SYS
```

CODE EXAMPLE: POST Output (Abridged)

```
-> start /SP/console

...
2007-12-19 22:01:17.810 0:0:0>INFO: STATUS: Running RGMII 1G
BCM5466R PHY level Loopback Test
2007-12-19 22:01:22.534 0:0:0>End  : Neptune 1G Loopback Test -
Port 2
2007-12-19 22:01:22.553 0:0:0>
2007-12-19 22:01:22.542 0:0:0>Begin: Neptune 1G Loopback Test -
Port 3
2007-12-19 22:01:22.556 0:0:0>INFO: STATUS: Running BMAC level
Loopback Test
2007-12-19 22:01:32.004 0:0:0>End  : Neptune 1G Loopback Test -
Port 3
2007-12-19 22:01:27.271 0:0:0>
T5440, No Keyboard
Enter #. to return to ALOM.
2007-12-19 22:01:32.012 0:0:0>INFO:
2007-12-19 22:01:27.274 0:0:0>INFO: STATUS: Running RGMII 1G
BCM5466R PHY level Loopback Test
OpenBoot ..., 7968 MB memory available, Serial #75916434.
2007-12-19 22:01:32.019 0:0:0>POST Passed all devices.
[stacie obp #0]
2007-12-19 22:01:32.028 0:0:0>POST:Return to VBSC.
Ethernet address 0:14:4f:86:64:92, Host ID: xxxxx
2007-12-19 22:01:32.036 0:0:0>Master set ACK for vbsc runpost
command and spin...
{0} ok
```

Detecting Faults

This section describes the different methods you can use to identify system faults in the SPARC Enterprise T5440.

Task	Topic
Use front panel and back panel LEDs to identify system faults.	"Detecting Faults Using LEDs" on page 30
Use the ILOM `show faulty` command to detect faults.	"Detecting Faults Using ILOM `show faulty` Command" on page 32
Use Solaris OS files and commands to detect faults.	"Detecting Faults Using Solaris OS Files and Commands" on page 35
Use the ILOM event log to detect faults.	"Detecting Faults Using the ILOM Event Log" on page 37
Use POST to identify faults.	"Detecting Faults Using POST" on page 42
Use Solaris Predictive Self-Healing (PSH) to identify faults.	"Identifying Faults Detected by PSH" on page 44

Detecting Faults Using LEDs

The server provides the following groups of LEDs:

- Front panel system LEDs. See "Front Panel LEDs" on page 4.
- Rear panel system LEDs. See "Rear Panel LEDs" on page 7.
- Hard drive LEDs. See "Hard Drive LEDs" on page 80.
- Power supply LEDs. See "Power Supply LED" on page 91.
- Fan tray LEDs. See "Fan Tray Fault LED" on page 84.
- Rear panel Ethernet port LEDs. See "Ethernet Port LEDs" on page 8.
- CMP module or memory module LEDs. See "Servicing CMP/Memory Modules" on page 98
- FB-DIMM Fault LEDs. See "FB-DIMM Fault Button Locations" on page 113.

These LEDs provide a quick visual check of the state of the system.

TABLE: ASR Commands on page 51 describes which fault LEDs are lit under given error conditions. Use the ILOM `show faulty` command to obtain more information about the nature of a given fault. See "Detect Faults Using the ILOM `show faulty` Command" on page 33.

TABLE: System Faults and Fault LED States

Component Fault	Fault LEDs Lit	Additional Information
Power supply	• Service Required LED (front and rear panel) • Front panel Power Supply Fault LED • Individual power supply Fault LED	• "Front Panel LEDs" on page 4 • "Rear Panel LEDs" on page 7 • "Power Supply LED" on page 91 • "Servicing Power Supplies" on page 85
Fan tray	• Service Required LED (front and rear panel) • Front panel Fan Fault LED • Individual fan tray Fault LED • Overtemp LED (if overtemp condition exists)	• "Front Panel LEDs" on page 4 • "Rear Panel LEDs" on page 7 • "Fan Tray Fault LED" on page 84 • "Servicing Fan Trays" on page 81
Hard drive	• Service Required LED (front and rear panel) • Individual hard drive Fault LED	See these sections: • "Front Panel LEDs" on page 4 • "Rear Panel LEDs" on page 7 • "Hard Drive LEDs" on page 80 • "Servicing Hard Drives" on page 72

TABLE: System Faults and Fault LED States *(Continued)*

Component Fault	Fault LEDs Lit	Additional Information
CMP module or memory module	• Service Required LED (front and rear panel) • CMP Module Fault LED or Memory Module Fault LED	A lit CMP module or memory module fault LED might indicate a problem with an FB-DIMM installed on the CMP module, or a problem with the CMP module itself. See these sections: • "Front Panel LEDs" on page 4 • "Rear Panel LEDs" on page 7 • "Servicing CMP/Memory Modules" on page 98 • "Servicing FB-DIMMs" on page 104
FB-DIMM	• Service Required LED (front and rear panel) • CMP Module Fault LED or Memory Module Fault LED • FB-DIMM Fault LED (CMP and memory modules) (when FB-DIMM Locate button is pressed)	See these sections: • "Front Panel LEDs" on page 4 • "Rear Panel LEDs" on page 7 • "Servicing FB-DIMMs" on page 104 • "FB-DIMM Fault Button Locations" on page 113
Other components	• Service Required LED (front and rear panel)	Not all components have an individual component Fault LED. If the Service Required LED is lit, use the `show faulty` command to obtain additional information about the component affected. See these sections: • "Front Panel LEDs" on page 4 • "Rear Panel LEDs" on page 7

Related Information

- "Diagnostic Flowchart" on page 11
- "Detecting Faults Using LEDs" on page 30
- "ILOM-to-ALOM CMT Command Reference" on page 53
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*
- *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server*

Detecting Faults Using ILOM `show faulty` Command

Use the ILOM `show faulty` command to display the following kinds of faults:

- **Environmental or configuration faults** – System configuration faults. Or temperature or voltage problems that might be caused by faulty FRUs (power supplies, fans, or blower), or by room temperature or blocked air flow to the server.
- **POST-detected faults** – Faults on devices detected by the POST diagnostics.
- **PSH-detected faults** – Faults detected by the Solaris Predictive Self-Healing (PSH) technology.
- **External I/O Expansion Unit faults** – Faults detected in the optional External I/O Expansion Unit.

Use the `show faulty` command for the following reasons:

- To see if any faults have been diagnosed in the system.
- To verify that the replacement of a FRU has cleared the fault and not generated any additional faults.

Related Information

- "Diagnostic Flowchart" on page 11
- "Detecting Faults Using LEDs" on page 30
- "ILOM-to-ALOM CMT Command Reference" on page 53
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*
- *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server*

▼ Detect Faults Using the ILOM `show faulty` Command

- **At the `->` prompt, type the `show faulty` command.**

  The following `show faulty` command examples show the different kinds of output from the `show faulty` command:

  - Example of the `show faulty` command when no faults are present:

```
-> show faulty
Target               | Property                | Value
---------------------+-------------------------+------------------------------

------------------------------------------------------------------------------
```

- Example of the `show faulty` command displaying an environmental fault:

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+-------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/MB/FT1
/SP/faultmgmt/0     | timestamp              | Dec 14 23:01:32
/SP/faultmgmt/0/    | timestamp              | Dec 14 23:01:32 faults/0
/SP/faultmgmt/0/    | sp_detected_fault      | TACH at /SYS/MB/FT1 has
faults/0            |                        | exceeded low non-recoverable
                    |                        | threshold.
```

- Example of the `show faulty` command displaying a configuration fault:

```
-> show faulty
Target             | Property              | Value
-------------------+-----------------------+----------------------------------
/SP/faultmgmt/0    | fru                   | /SYS
/SP/faultmgmt/0    | timestamp             | Mar 17 08:17:45
/SP/faultmgmt/0/   | timestamp             | Mar 17 08:17:45
faults/0           |                       |
/SP/faultmgmt/0/   | sp_detected_fault     | At least 2 power supplies must
faults/0           |                       | have AC power
```

Note – Environmental and configuration faults automatically clear when the environmental condition returns to the normal range of when the configuration fault is addressed.

- Example showing a fault that was detected by the PSH technology. These kinds of faults are distinguished from other kinds of faults by the presence of a `sunw-msg-id` and by a UUID.

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+--------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/MB/MEM0/CMP0/BR1/CH1/D1
/SP/faultmgmt/0     | timestamp              | Dec 14 22:43:59
/SP/faultmgmt/0/    | sunw-msg-id            | SUN4V-8000-DX
faults/0            |                        |
/SP/faultmgmt/0/    | uuid                   | 3aa7c854-9667-e176-efe5-e487e520
faults/0            |                        | 7a8a
/SP/faultmgmt/0/    | timestamp              | Dec 14 22:43:59
faults/0            |                        |
```

- Example showing a fault that was detected by POST. These kinds of faults are identified by the message `Forced fail` *reason* where *reason* is the name of the power-on routine that detected the failure.

```
-> show faulty
Target               | Property                | Value
---------------------+-------------------------+-------------------------------
/SP/faultmgmt/0      | fru                     | /SYS/MB/CPU0/CMP0/BR1/CH0/D0
/SP/faultmgmt/0      | timestamp               | Dec 21 16:40:56
/SP/faultmgmt/0/     | timestamp               | Dec 21 16:40:56
faults/0             |                         |
/SP/faultmgmt/0/     | sp_detected_fault       | /SYS/MB/CPU0/CMP0/CMP0/BR1/CH0/D0
faults/0                                       | Forced fail(POST)
```

- Example showing a fault in the External I/O Expansion Unit. These faults can be identified by the text string `Ext FRU` or `Ext sensor` at the beginning of the fault description.

  The text string `Ext FRU` indicates that the specified FRU is faulty and should be replaced. The text string `Ext sensor` indicates that the specified FRU contains the sensor that detected the problem. In this case, the specified FRU may not be faulty. Contact service support to isolate the problem.

```
-> show faulty
Target               | Property                | Value
---------------------+-------------------------+-------------------------------
/SP/faultmgmt/0      | fru                     | /SYS/IOX@X0TC/IOB1/LINK
/SP/faultmgmt/0      | timestamp               | Feb 05 18:28:20
/SP/faultmgmt/0/     | timestamp               | Feb 05 18:28:20
 faults/0            |                         |
/SP/faultmgmt/0/     | sp_detected_fault       | Ext FRU /SYS/IOX@X0TC/IOB1/LINK
 faults/0            |                         | SIGCON=0 I2C no device response
```

Detecting Faults Using Solaris OS Files and Commands

With the Solaris OS running on the server, you have the full complement of Solaris OS files and commands available for collecting information and for troubleshooting.

If POST, ILOM, or the Solaris PSH features do not indicate the source of a fault, check the message buffer and log files for notifications for faults. Hard drive faults are usually captured by the Solaris message files.

Use the `dmesg` command to view the most recent system message. To view the system messages log file, view the contents of the `/var/adm/messages` file.

Related Information

- "Diagnostic Flowchart" on page 11
- "Detecting Faults Using LEDs" on page 30
- "ILOM-to-ALOM CMT Command Reference" on page 53
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*
- *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server*

▼ Check the Message Buffer

1. **Log in as superuser.**
2. **Issue the `dmesg` command:**

```
# dmesg
```

The `dmesg` command displays the most recent messages generated by the system.

▼ View System Message Log Files

The error logging daemon, `syslogd`, automatically records various system warnings, errors, and faults in message files. These messages can alert you to system problems such as a device that is about to fail.

The `/var/adm` directory contains several message files. The most recent messages are in the `/var/adm/messages` file. After a period of time (usually every week), a new `messages` file is automatically created. The original contents of the `messages` file are rotated to a file named `messages.1`. Over a period of time, the messages are further rotated to `messages.2` and `messages.3`, and then deleted.

1. **Log in as superuser.**
2. **Type the following command:**

```
# more /var/adm/messages
```

3. **If you want to view all logged messages, type the following command:**

```
# more /var/adm/messages*
```

Detecting Faults Using the ILOM Event Log

Certain problems are recorded in the ILOM event log but not posted to the list of faults displayed by the ILOM `show faulty` command. Inspect the ILOM event log if you suspect a problem, but no entry appears in the ILOM `show faulty` command output.

Related Information

- "Diagnostic Flowchart" on page 11
- "View ILOM Event Log" on page 37
- "ILOM-to-ALOM CMT Command Reference" on page 53
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*
- *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server*

▼ View ILOM Event Log

- **Type the following command:**

```
-> show /SP/logs/event/list
```

Note – The ILOM event log can also be viewed through the ILOM BUI or the ALOM CMT CLI.

If a "major" or "critical" event is found that was not expected and not included under ILOM show faulty than it may indicate a system fault. The following is an example of unexpected major events in the log.

```
-> show /sp/logs/event/list
1626 Fri Feb 15 18:57:29 2008 Chassis Log major
Feb 15 18:57:29 ERROR: [CMP0 ] Only 4 cores, up to 32 cpus are
configured because some L2_BANKS are unusable

1625 Fri Feb 15 18:57:28 2008 Chassis Log major
Feb 15 18:57:28 ERROR: System DRAM Available: 004096 MB

1624 Fri Feb 15 18:57:28 2008 Chassis Log major
Feb 15 18:57:28 ERROR: [CMP1 ] memc_1_1 unused because associated
L2 banks on CMP0 cannot be used
```

```
1623 Fri Feb 15 18:57:27 2008 Chassis Log major
Feb 15 18:57:27 ERROR: Degraded configuration: system operating at
reduced capacity

1622 Fri Feb 15 18:57:27 2008 Chassis Log major
Feb 15 18:57:27 ERROR: [CMP0] /MB/CPU0/CMP0/BR1 neither channel
populated with DIMM0 Branch 1 not configured
```

Detecting Faults Using SunVTS Software

The SunVTS software features a Java-based browser environment, an ASCII-based screen interface, and a command-line interface. For more information about how to use the SunVTS software, see the *SunVTS 7.0 User's Guide.*

The Solaris OS must be running in order to use the SunVTS software. You also must ensure that the SunVTS validation test software is installed on your system.

This section describes the tasks necessary to use SunVTS software to exercise your server.

Related Information

- "Diagnostic Flowchart" on page 11
- "Verify Installation of SunVTS Software" on page 38
- "Start the SunVTS Browser Environment" on page 39
- "SunVTS Software Packages" on page 41
- "Useful SunVTS Tests" on page 42
- *SPARC Enterprise T5440 Server Administration Guide*
- *SunVTS 7.0 User's Guide*

▼ Verify Installation of SunVTS Software

To perform this procedure, the Solaris OS must be running on the server, and you must have access to the Solaris command line.

Note – The SunVTS 7.0 software, and future compatible versions, are supported on the server.

The SunVTS installation process requires that you specify one of two security schemes to use when running SunVTS. The security scheme you choose must be properly configured in the Solaris OS for you to run the SunVTS software. For details, refer to the *SunVTS User's Guide*.

1. **Check for the presence of SunVTS packages using the `pkginfo` command.**

```
% pkginfo -l SUNWvts SUNWvtsmn SUNWvtsr SUNWvtss SUNWvtsts
```

   - If the SunVTS software is installed, information about the packages is displayed.
   - If the SunVTS software is not installed, you see an error message for each missing package, as in CODE EXAMPLE: Missing Package Errors for SunVTS Software on page 39.

   See TABLE: SunVTS Software Packages on page 41 for a list of required SunVTS software packages.

2. **If the SunVTS software is not installed, you can obtain the installation packages from the following places:**
   - Solaris Operating System DVDs
   - Download from the web. Refer to the Preface for information on how to access the web site.

CODE EXAMPLE: Missing Package Errors for SunVTS Software

```
ERROR: information for "SUNWvts" was not found
ERROR: information for "SUNWvtsr" was not found
...
```

▼ Start the SunVTS Browser Environment

For information about test options and prerequisites, refer to the *SunVTS 7.0 User's Guide*.

Note – SunVTS software can be run in several modes. You must perform this procedure using the default mode.

---

1. **Start the SunVTS agent and Javabridge on the server.**

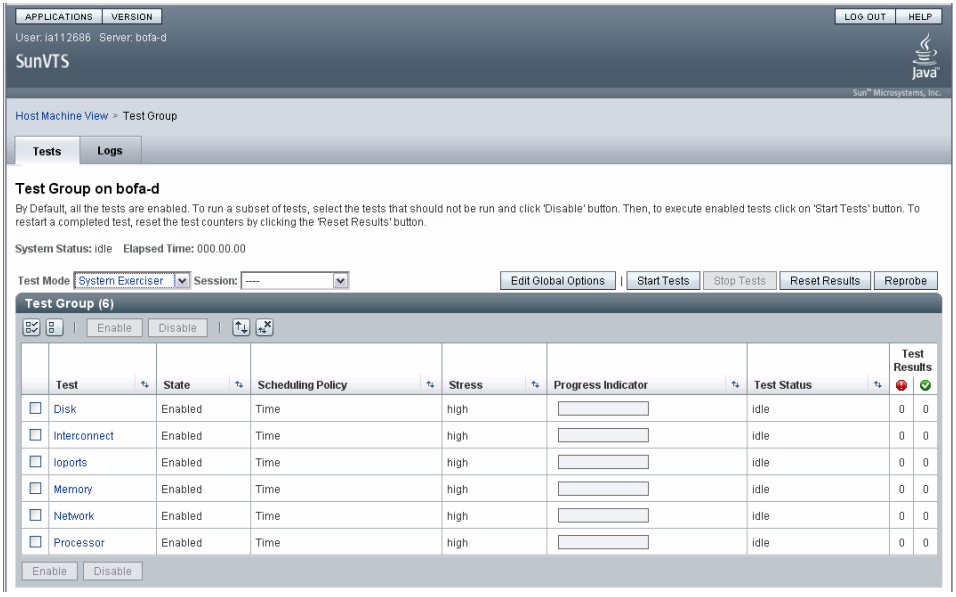
```
# cd /usr/sunvts/bin
# ./startsunvts
```

2. **At the interface prompt, choose `C` to start the SunVTS client.**

3. **Start the SunVTS browser environment from a web browser on the client system. Type** `https://`***server-name***`:6789`**.**

   The SunVTS browser environment is displayed (FIGURE: SunVTS Browser Environment (Test Group Screen) on page 40).

FIGURE: SunVTS Browser Environment (Test Group Screen)


APPLICATIONS
VERSION
LOG OUT
HELP
User: ia112686 Server: bofa-d
SunVTS
Java
Sun™ Microsystems, Inc.
Host Machine View > Test Group
Tests
Logs
Test Group on bofa-d
By Default, all the tests are enabled. To run a subset of tests, select the tests that should not be run and click 'Disable' button. Then, to execute enabled tests click on 'Start Tests' button. To restart a completed test, reset the test counters by clicking the 'Reset Results' button.
System Status: idle Elapsed Time: 000.00.00
Test Mode System Exerciser Session: ---
Edit Global Options
Start Tests
Stop Tests
Reset Results
Reprobe
Test Group (6)
Enable
Disable
Test
State
Scheduling Policy
Stress
Progress Indicator
Test Status
Test Results
Disk Enabled Time high idle 0 0
Interconnect Enabled Time high idle 0 0
Ioports Enabled Time high idle 0 0
Memory Enabled Time high idle 0 0
Network Enabled Time high idle 0 0
Processor Enabled Time high idle 0 0
Enable
Disable

4. **(Optional) Select the test categories you want to run.**

   Certain test categories are enabled by default. You can choose to accept these.

Note – TABLE: Useful SunVTS Tests on page 42 lists test categories that are especially useful to run on this server.

---

5. **(Optional) Customize individual tests.**

   Click on the name of the test to select and customize individual tests.

Tip – Use the System Excerciser – High Stress Mode to test system operations. Use the Component Stress – High setting for the highest stress possible.

---

6. **Start testing.**

   Click the Start Tests button. Status and error messages appear in the test messages area located across the bottom of the window. You can stop testing at any time by clicking the Stop button.

   During testing, the SunVTS software logs all status and error messages. To view these messages, click the Logs tab. You can choose to view the following logs:

   - **Test Error** – Detailed error messages from individual tests.
   - **SunVTS Test Kernel (Vtsk) Error** – Error messages pertaining to the SunVTS software itself. Look here if the SunVTS software appears to be acting strangely, especially when it starts up.
   - **Information** – Detailed versions of all the status and error messages that appear in the test messages area.
   - **Solaris OS Messages** (`/var/adm/messages`) – A file containing messages generated by the operating system and various applications.
   - **Test Messages** (`/var/sunvts/logs/sunvts.info`) – A directory containing the SunVTS log files.

SunVTS Software Packages

TABLE: SunVTS Software Packages on page 41 lists SunVTS packages.

TABLE: SunVTS Software Packages

Package	Description
`SUNWvts`	Test development library APIs and SunVTS kernel. You must install this package to run the SunVTS software.
`SUNWvtsmn`	Man pages for the SunVTS utilities, including the command-line utility.
`SUNWvtsr`	SunVTS framework (root)
`SUNWvtss`	SunVTS browser user interface (BUI) components required on the server system.
`SUNWvtsts`	SunVTS test binaries

Related Information

- "Diagnostic Flowchart" on page 11
- "Useful SunVTS Tests" on page 42
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*

Useful SunVTS Tests

TABLE: Useful SunVTS Tests on page 42 describes the SunVTS tests which are useful for diagnosing issues with the SPARC Enterprise T5440 server.

TABLE: Useful SunVTS Tests

SunVTS Tests	FRUs Exercised by Tests
Memory Test	FB-DIMMs
Processor Test	CMP, motherboard
Disk Test	Disks, cables, disk backplane, DVD drive
Network Test	Network interface, network cable, CMP, motherboard
Interconnect Test	Board ASICs and interconnects
IO Ports Test	I/O (serial port interface), USB subsystem
Environmental Test	Motherboard and service processor

Related Information

- "Diagnostic Flowchart" on page 11
- "SunVTS Software Packages" on page 41
- *SPARC Enterprise T5440 Server Installation and Setup Guide*
- *SPARC Enterprise T5440 Server Administration Guide*

Detecting Faults Using POST

Run POST in maximum mode to detect system faults. See "Run POST in Maximum Mode" on page 28.

POST error messages use the following syntax:

```
c:s > ERROR: TEST = failing-test
c:s > H/W under test = FRU
c:s > Repair Instructions: Replace items in order listed by H/W under
test above
c:s > MSG = test-error-message
c:s > END_ERROR
```

In this syntax, *c* = the core number, *s* = the strand number.

Warning and informational messages use the following syntax:

INFO or WARNING: *message*

In CODE EXAMPLE: POST Error Message on page 43, POST reports a memory error at FB-DIMM location /SYS/MB/CPU0/CMP0/BR1/CH0/D0. The error was detected by POST running on core 7, strand 2.

CODE EXAMPLE: POST Error Message

```
7:2>
7:2>ERROR: TEST = Data Bitwalk
7:2>H/W under test = /SYS/MB/CPU0/CMP0/BR1/CH0/D0
7:2>Repair Instructions: Replace items in order listed by 'H/W
under test' above.
7:2>MSG = Pin 149 failed on /SYS/MB/CPU0/CMP0/BR1/CH0/D0 (J792)
7:2>END_ERROR

7:2>Decode of Dram Error Log Reg Channel 2 bits
60000000.0000108c
7:2> 1 MEC 62 R/W1C Multiple corrected
errors, one or more CE not logged
7:2> 1 DAC 61 R/W1C Set to 1 if the error
was a DRAM access CE
7:2> 108c SYND 15:0 RW ECC syndrome.
7:2>
7:2> Dram Error AFAR channel 2 = 00000000.00000000
7:2> L2 AFAR channel 2 = 00000000.00000000
```

Perform further investigation if needed.

- If POST detects a faulty device, the fault is displayed and the fault information is passed to the service processor for fault handling. Faulty FRUs are identified in fault messages using the FRU name.
- The fault is captured by the service processor, where the fault is logged, the Service Required LED is lit, and the faulty component is disabled. See CODE EXAMPLE: Fault Detected by POST on page 48.
- Run the ILOM `show faulty` command to obtain additional fault information.

In this example, /SYS/MB/CPU0/CMP0/BR1/CH0/D0 is disabled. The system can boot using memory that was not disabled until the faulty component is replaced.

Note – You can use ASR commands to display and control disabled components. See "Disabling Faulty Components" on page 50.

Related Information

- "Diagnostic Flowchart" on page 11

- "POST Fault Management Overview" on page 19
- "POST Fault Management Flowchart" on page 20
- *SPARC Enterprise T5440 Server Administration Guide*

Identifying Faults Detected by PSH

When a PSH fault is detected, a Solaris console message similar to CODE EXAMPLE: Console Message Showing Fault Detected by PSH on page 44 is displayed.

CODE EXAMPLE: Console Message Showing Fault Detected by PSH

```
SUNW-MSG-ID: SUN4V-8000-DX, TYPE: Fault, VER: 1, SEVERITY: Minor
EVENT-TIME: Wed Sep 14 10:09:46 EDT 2005
PLATFORM: SUNW,system_name, CSN: -, HOSTNAME: wgs48-37
SOURCE: cpumem-diagnosis, REV: 1.5
EVENT-ID: f92e9fbe-735e-c218-cf87-9e1720a28004
DESC: The number of errors associated with this memory module has exceeded
acceptable levels.  Refer to http://sun.com/msg/SUN4V-8000-DX for more
information.
AUTO-RESPONSE: Pages of memory associated with this memory module are being
removed from service as errors are reported.
IMPACT: Total system memory capacity will be reduced as pages are retired.
REC-ACTION: Schedule a repair procedure to replace the affected memory module.
Use fmdump -v -u <EVENT_ID> to identify the module.
```

Faults detected by the Solaris PSH facility are also reported through service processor alerts.

Note – You can configure ILOM to generate SNMP traps or e-mail alerts when a fault is detected by Solaris PSH. You can also configure the ALOM CMT compatibility shell to display Solaris PSH alerts. See the *Integrated Lights Out Manager 3.0 Concepts Guide*.

CODE EXAMPLE: ALOM CMT Alert of PSH Diagnosed Fault on page 44 depicts an ALOM CMT alert of the same fault reported by Solaris PSH in CODE EXAMPLE: Console Message Showing Fault Detected by PSH on page 44.

CODE EXAMPLE: ALOM CMT Alert of PSH Diagnosed Fault

```
SC Alert: Host detected fault, MSGID: SUN4V-8000-DX
```

The ILOM `show faulty` command provides summary information about the fault. See "Detect Faults Using the ILOM `show faulty` Command" on page 33 for more information about the `show faulty` command.

Note – The Service Required LED is also turned on for PSH diagnosed faults.

Related Information

- "Diagnostic Flowchart" on page 11
- "Solaris Predictive Self-Healing Overview" on page 17
- "ILOM-to-ALOM CMT Command Reference" on page 53
- *SPARC Enterprise T5440 Server Administration Guide*
- *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server*

▼ Detect Faults Identified by the Solaris PSH Facility Using the ILOM `fmdump` Command

The ILOM `fmdump` command displays the list of faults detected by the Solaris PSH facility and identifies the faulty FRU for a particular EVENT_ID (UUID).

Note – Do not use `fmdump` to verify that a FRU replacement has cleared a fault, because the output of `fmdump` is the same after the FRU has been replaced. Use the `fmadm faulty` command to verify that the fault has cleared. See "Clear Faults Detected by PSH" on page 49.

1. **Check the event log using the `fmdump` command with `-v` for verbose output.**

   In CODE EXAMPLE: Output from the `fmdump -v` Command on page 46, a fault is displayed, indicating the following details.

   - Date and time of the fault (Jul 31 12:47:42.2007)
   - Universal Unique Identifier (UUID). The UUID is unique for every fault (`fd940ac2-d21e-c94a-f258-f8a9bb69d05b`)
   - Message identifier, which can be used to obtain additional fault information (`SUN4V-8000-JA`)
   - Faulted FRU. The information provided in the example includes the part number of the FRU (`part=541215101`) and the serial number of the FRU (`serial=101083`). The `Location` field provides the name of the FRU. In CODE EXAMPLE: Output from the `fmdump -v` Command on page 46 the FRU name is `MB`, meaning the motherboard.

Note – `fmdump` displays the PSH event log. Entries remain in the log after the fault has been repaired.

2. **Use the message ID to obtain more information about this type of fault.**

   a. **In a browser, go to the Predictive Self-Healing Knowledge Article web site:** `http://www.sun.com/msg`

   b. **Obtain the message ID from the console output or the ILOM** `show faulty` **command.**

   c. **Enter the message ID in the SUNW-MSG-ID field, and click Lookup.**

      In CODE EXAMPLE: PSH Message Output on page 46, the message ID SUN4V-8000-JA provides information for corrective action:

3. **Follow the suggested actions to repair the fault.**

CODE EXAMPLE: Output from the `fmdump -v` Command

```
# fmdump -v -u fd940ac2-d21e-c94a-f258-f8a9bb69d05b
TIME                 UUID                                 SUNW-MSG-ID
Jul 31 12:47:42.2007 fd940ac2-d21e-c94a-f258-f8a9bb69d05b SUN4V-8000-JA
  100%  fault.cpu.ultraSPARC-T2.misc_regs

        Problem in: cpu:///cpuid=16/serial=5D67334847
           Affects: cpu:///cpuid=16/serial=5D67334847
               FRU: hc://:serial=101083:part=541215101/motherboard=0
          Location: MB
```

CODE EXAMPLE: PSH Message Output

```
CPU errors exceeded acceptable levels

Type
    Fault
Severity
    Major
Description
    The number of errors associated with this CPU has exceeded
acceptable levels.
Automated Response
    The fault manager will attempt to remove the affected CPU from
service.
Impact
    System performance may be affected.

Suggested Action for System Administrator
```

CODE EXAMPLE: PSH Message Output *(Continued)*

```
    Schedule a repair procedure to replace the affected CPU, the
identity of which can be determined using fmdump -v -u <EVENT_ID>.

Details
    The Message ID:  SUN4V-8000-JA indicates diagnosis has
determined that a CPU is faulty. The Solaris fault manager arranged
an automated attempt to disable this CPU....
```

Clearing Faults

This section describes how to clear faults.

Note – Some system faults are cleared automatically.

Task	Topic
Clear faults detected during POST.	"Clear Faults Detected During POST" on page 48
Clear faults detected by PSH.	"Clear Faults Detected by PSH" on page 49
Clear faults detected in the Internal I/O Expansion Unit	"Clear Faults Detected in the External I/O Expansion Unit" on page 50

Related Information

- "Diagnostic Flowchart" on page 11
- "POST Fault Management Overview" on page 19
- "Solaris Predictive Self-Healing Overview" on page 17
- *SPARC Enterprise T5440 Server Administration Guide*
- *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server*
- *External I/O Expansion Unit Installation and Service Manual for SPARC Enterprise T5120/T5140/T5220/T5240/T5440 Servers*

▼ Clear Faults Detected During POST

In most cases, when POST detects a faulty component, POST logs the fault and automatically takes the failed component out of operation by placing the component in the ASR blacklist. See "Disabling Faulty Components" on page 50.

In most cases, the replacement of the faulty FRU is detected when the service processor is reset or power cycled. In this case, the fault is automatically cleared from the system. This procedure describes how to identify a POST-detected fault and, if necessary, manually clear the fault.

1. **After replacing a faulty FRU, at the ILOM prompt use the** `show faulty` **command to identify POST-detected faults.**

   Faults detected by POST are distinguished from other kinds of faults by the text: `Forced fail`. No UUID number is reported. Refer to CODE EXAMPLE: Fault Detected by POST on page 48.

   If no fault is reported, you do not need to do anything else. Do not perform the subsequent steps.

2. **Use the** `component_state` **property of the component to clear the fault and remove the component from the ASR blacklist.**

   Use the FRU name that was reported in the fault in Step 1:

```
-> set /SYS/MB/CPU0/CMP0/BR1/CH0/D0 component_state=Enabled
```

   The fault is cleared and should not show up when you run the `show faulty` command. Additionally, the Service Required LED is no longer on.

3. **Reset the server.**

   You must reboot the server for the `component_state` property to take effect.

4. **At the ILOM prompt, use the** `show faulty` **command to verify that no faults are reported.**

```
-> show faulty
Target              | Property                | Value
--------------------+-------------------------+------------------

->
```

CODE EXAMPLE: Fault Detected by POST

```
-> show faulty
Target                | Property                | Value
----------------------+-------------------------+-----------------------------
/SP/faultmgmt/0       | fru                     | /SYS/MB/CPU0/CMP0/BR1/CH0/D0
```

CODE EXAMPLE: Fault Detected by POST *(Continued)*

```
/SP/faultmgmt/0       | timestamp              | Dec 21 16:40:56
/SP/faultmgmt/0/      | timestamp              | Dec 21 16:40:56
faults/0              |                        |
/SP/faultmgmt/0/      | sp_detected_fault      | /SYS/MB/CPU0/CMP0/BR1/CH0/D0
faults/0              |                        | Forced fail(POST)
```

▼ Clear Faults Detected by PSH

When the Solaris PSH facility detects faults, the faults are logged and displayed on the console. In most cases, after the fault is repaired, the corrected state is detected by the system and the fault condition is repaired automatically. However, this repair should be verified. In cases where the fault condition is not automatically cleared, the fault must be cleared manually.

1. **After replacing a faulty FRU, power on the server.**
2. **At the ILOM prompt, use the** `show faulty` **command to identify PSH-detected faults.**
   - If no fault is reported, you do not need to do anything else. Do not perform the subsequent steps.
   - If a fault is reported, perform Step 3 and Step 4.
3. **Use the** `clear_fault_action` **property of the FRU to clear the fault from the service processor. For example:**

```
-> set /SYS/MB/CPU0/CMP0/BR0/CH0/D0 clear_fault_action=True
Are you sure you want to clear /SYS/MB/CPU0/CMP0/BR0/CH0/D0 (y/n)? y
Set 'clear_fault_action' to 'true
```

4. **Clear the fault from all persistent fault records.**

   In some cases, even though the fault is cleared, some persistent fault information remains and results in erroneous fault messages at boot time. To ensure that these messages are not displayed, perform the following Solaris command:

   `fmadm repair` *UUID*

   Example:

```
# fmadm repair 7ee0e46b-ea64-6565-e684-e996963f7b86
```

▼ Clear Faults Detected in the External I/O Expansion Unit

For service processor detected faults in the External I/O Expansion Unit, the fault must be manually cleared from ILOM `show faulty` after the problem has been repaired.

Note – After the problem has been repaired, the fault will also be cleared from the ILOM `show faulty` command by resetting the service processor.

The example below shows a problem detected in the External I/O Expansion Unit:

```
-> show faulty
Target               | Property                | Value
---------------------+-------------------------+-------------------
-------------
/SP/faultmgmt/0     | fru                 | /SYS/IOX@X0TC/IOB1/LINK
/SP/faultmgmt/0      | timestamp               | Feb 05 18:28:20
/SP/faultmgmt/0/     | timestamp               | Feb 05 18:28:20
 faults/0            |                         |
/SP/faultmgmt/0/     | sp_detected_fault       | Ext FRU
/SYS/IOX@X0TC/IOB1/LINK
 faults/0            |                         | SIGCON=0 I2C no
device response
```

- **After the problem is repaired, use the ILOM `set clear_fault_action` command to clear a fault in the External I/O Expansion Unit.**

```
-> set clear_fault_action=true /SYS/IOX@X0TC/IOB1/LINK
Are you sure you want to clear /SYS/IOX@X0TC/IOB1/LINK (y/n)? y
Set 'clear_fault_action' to 'true'
```

Disabling Faulty Components

You can use the Automatic System Recovery (ASR) feature to configure the server to automatically disable failed components until they can be replaced. The following components are managed by the ASR feature:

- UltraSPARC T2 Plus processor strands
- Memory FB-DIMMs

- I/O subsystem

The database that contains the list of disabled components is referred to as the ASR blacklist (`asr-db`).

In most cases, POST automatically disables a faulty component. After the cause of the fault is repaired (FRU replacement, loose connector reseated, and so on), you might need to remove the component from the ASR blacklist.

Note – For instructions on enabling or disabling ASR, see the *SPARC Enterprise T5440 Server Administration Guide*.

The ASR commands (TABLE: ASR Commands on page 51) enable you to view and manually add or remove components (`asrkeys`) from the ASR blacklist. You run these commands from the ILOM `->` prompt.

TABLE: ASR Commands

Command	Description
`show components`	Displays system components and their current state.
`set` *asrkey* `component_state=Enabled`	Removes a component from the `asr-db` blacklist, where *asrkey* is the component to enable.
`set` *asrkey* `component_state=Disabled`	Adds a component to the `asr-db` blacklist, where *asrkey* is the component to disable.

Note – The *asrkeys* vary from system to system, depending on how many cores and memory are present. Use the `show components` command to see the *asrkeys* on a given system.

Note – A reset or power cycle is required after disabling or enabling a component. If the status of a component is changed, there is no effect to the system until the next reset or power cycle.

Related Information

- "Diagnostic Flowchart" on page 11
- "Detecting Faults" on page 30
- *SPARC Enterprise T5440 Server Administration Guide*

▼ Disable System Components

The `component_state` property disables a component by adding it to the ASR blacklist.

1. At the `->` prompt, set the `component_state` property to `Disabled`:

```
-> set /SYS/MB/CPU0/CMP0/BR1/CH0/D0 component_state=Disabled
```

2. Reset the server so that the ASR command takes effect.

```
-> stop /SYS
Are you sure you want to stop /SYS (y/n)? y
Stopping /SYS
-> start /SYS
Are you sure you want to start /SYS (y/n)? y
Starting /SYS
```

Note – In the ILOM shell there is no notification when the system is actually powered off. Powering off takes about a minute. Use the `show /HOST` command to determine if the host has powered off.

▼ Re-Enable System Components

The `component_state` property enables a component by removing it from the ASR blacklist.

1. At the `->` prompt, set the `component_state` property to `Enabled`.

```
-> set /SYS/MB/CPU0/CMP0/BR1/CH0/D0 component_state=Enabled
```

2. Reset the server so that the ASR command takes effect.

```
-> stop /SYS
Are you sure you want to stop /SYS (y/n)? y
Stopping /SYS
-> start /SYS
Are you sure you want to start /SYS (y/n)? y
Starting /SYS
```

Note – In the ILOM shell there is no notification when the system is actually powered off. Powering off takes about a minute. Use the `show /HOST` command to determine if the host has powered off.

ILOM-to-ALOM CMT Command Reference

TABLE: ALOM CMT Parameters and POST Modes on page 56 describes the typical commands for servicing a server. For descriptions of all ALOM CMT commands, issue the `help` command or refer to the following documents:

- *Integrated Lights Out Manager 3.0 Concepts Guide*
- *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server*

TABLE: Service-Related Commands

ILOM Command	ALOM CMT Command	Description
`help` *[command]*	help [*command*]	Displays a list of all available commands with syntax and descriptions. Specifying a command name as an option displays help for that command.
`set /HOST/send_break_action true`	break [`-y`][`-c`][`-D`] • `-y` skips the confirmation question. • `-c` executes a `console` command after the `break` command completes. • `-D` forces a core dump of the Solaris OS.	Takes the host server from the OS to either `kmdb` or OpenBoot PROM (equivalent to a Stop-A), depending on the mode Solaris software was booted.
`set /SYS/`*component*`/clear_fault_action true`	clearfault *UUID*	Manually clears host-detected faults. The *UUID* is the unique fault ID of the fault to be cleared.
`start /SP/console`	console [-f] • `-f` forces the console to have read and write capabilities.	Connects you to the host system.

TABLE: Service-Related Commands *(Continued)*

ILOM Command	ALOM CMT Command	Description
`show /SP/console/history`	consolehistory [-b *lines* | -e *lines* | -v] [-g *lines*] [boot | run] The following options enable you to specify how the output is displayed: • `-g` *lines* specifies the number of lines to display before pausing. • `-e` *lines* displays *n* lines from the end of the buffer. • `-b` *lines* displays *n* lines from the beginning of the buffer. • `-v` displays the entire buffer. • `boot` | `run` specifies the log to display (`run` is the default log).	Displays the contents of the system's console buffer.
`set /HOST/bootmode/`*value*[normal | reset_nvram | bootscript=*string*]	bootmode *value* [normal | reset_nvram | bootscript=*string*]	Enables control of the firmware during system initialization with the following options: • `normal` is the default boot mode. • `reset_nvram` resets OpenBoot PROM parameters to their default values. • `bootscript=`*string* enables the passing of a string to the `boot` command.
`stop/SYS; start/SYS`	powercycle [`-f`] The `-f` option forces an immediate poweroff. Otherwise the command attempts a graceful shutdown.	Performs a `poweroff` followed by `poweron`.
`stop/SYS`	poweroff [`-y`] [`-f`] • `-y` enables you to skip the confirmation question. • `-f` forces an immediate shutdown.	Powers off the host server.
`start/SYS`	poweron [-c] • `-c` executes a `console` command after completion of the `poweron` command.	Powers on the host server.

TABLE: Service-Related Commands *(Continued)*

ILOM Command	ALOM CMT Command	Description
`set /SYS/PS`*x*`/prepare_to_remove_action true`	removefru PS0 | PS1	Indicates if it is okay to perform a hot-swap of a power supply. This command does not perform any action. But this command provides a warning if the power supply should not be removed because the other power supply is not enabled.
`reset /SYS`	reset [`-y`] [-c] • `-y` enables you to skip the confirmation question. • `-c` executes a `console` command after completion of the `reset` command.	Generates a hardware reset on the host server.
`reset /SP`	resetsc [`-y`] • `-y` enables you to skip the confirmation question.	Reboots the service processor.
`set /SYS/keyswitch_state` *value* `normal | stby | diag | locked`	`setkeyswitch [-y]` *value* `normal | stby | diag | locked` • `-y` enables you to skip the confirmation question when setting the keyswitch to `stby`.	Sets the virtual keyswitch.
`set /SUS/LOCATE value=`*value* [`Fast_blink | Off`]	setlocator *value* [`on | off`]	Turns the Locator LED on the server on or off.
(No ILOM equivalent.)	showenvironment	Displays the environmental status of the host server. This information includes system temperatures, power supply, front panel LED, hard drive, fan, voltage, and current sensor status. See "Display Individual Component Information With the ILOM `show` Command" on page 25.
`show faulty`	showfaults [`-v`]	Displays current system faults. See "Detecting Faults" on page 30.

TABLE: Service-Related Commands *(Continued)*

ILOM Command	ALOM CMT Command	Description
(No ILOM equivalent.)	showfru [`-g` *lines*] [`-s` | `-d`] [*FRU*] • `-g` *lines* specifies the number of lines to display before pausing the output to the screen. • `-s` displays static information about system FRUs (defaults to all FRUs, unless one is specified). • `-d` displays dynamic information about system FRUs (defaults to all FRUs, unless one is specified). See "Display Individual Component Information With the ILOM `show` Command" on page 25.	Displays information about the FRUs in the server.
`show /SYS/keyswitch_state`	showkeyswitch	Displays the status of the virtual keyswitch.
`show /SYS/LOCATE`	showlocator	Displays the current state of the Locator LED as either on or off.
`show /SP/logs/event/list`	showlogs [`-b` *lines* | `-e` *lines* | `-v`] [`-g` *lines*] [`-p logtype[r|p]`]	Displays the history of all events logged in the service processor event buffers (in RAM or the persistent buffers).
`show /SYS`	showplatform [`-v`]	Displays information about the operating state of the host system, the system serial number, and whether the hardware is providing service.

TABLE: ALOM CMT Parameters and POST Modes on page 56 shows typical combinations of ALOM CMT variables and associated POST modes.

TABLE: ALOM CMT Parameters and POST Modes

Parameter	Normal Diagnostic Mode (Default Settings)	No POST Execution	Diagnostic Service Mode	Keyswitch Diagnostic Preset Values
`diag mode`	`normal`	Off	`service`	`normal`
`keyswitch_state`	`normal`	`normal`	`normal`	`diag`
`diag_level`	`max`	N/a	`max`	`max`

TABLE: ALOM CMT Parameters and POST Modes

Parameter	Normal Diagnostic Mode (Default Settings)	No POST Execution	Diagnostic Service Mode	Keyswitch Diagnostic Preset Values
`diag_trigger`	`power-on-reset error-reset`	None	`all-resets`	`all-resets`
`diag_verbosity`	`normal`	N/a	`max`	`max`
Description of POST execution	This is the default POST configuration. This configuration tests the system thoroughly, and suppresses some of the detailed POST output.	POST does not run, resulting in quick system initialization. This is not a suggested configuration.	POST runs the full spectrum of tests with the maximum output displayed.	POST runs the full spectrum of tests with the maximum output displayed.

Related Information

- "Diagnostic Flowchart" on page 11
- "Detecting Faults Using LEDs" on page 30
- "ILOM-to-ALOM CMT Command Reference" on page 53
- *SPARC Enterprise T5440 Server Administration Guide*
- *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server*

Preparing to Service the System

These topics describe how to prepare the SPARC Enterprise T5440 for servicing.

Topic	Links
Observe proper safety practices.	"Safety Information" on page 59
Gather the tools needed to perform service procedures.	"Required Tools" on page 62
Obtain the chassis serial number.	"Obtain the Chassis Serial Number" on page 62
Power off the system.	"Powering Off the System" on page 63
Slide the server out of the equipment rack.	"Extending the Server to the Maintenance Position" on page 65
Remove the server from the equipment rack.	"Removing the Server From the Rack" on page 67
Remove the top cover to access internal components.	"Removing the Top Cover" on page 69

Related Information

- "Managing Faults" on page 9
- "Servicing Customer-Replaceable Units" on page 71
- "Servicing Field-Replaceable Units" on page 115
- "Returning the Server to Operation" on page 149

Safety Information

This section describes important safety information that you need to know prior to removing or installing parts in the SPARC Enterprise T5440 server.

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all cautions and instructions marked on the equipment and described in the documentation shipped with your system.
- Follow all cautions and instructions marked on the equipment and described in the *SPARC Enterprise T5440 Server Safety and Compliance Guide*.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Follow the electrostatic discharge safety practices as described in this section.

Related Information

- "Safety Symbols" on page 60
- "Antistatic Wrist Strap" on page 61
- "Antistatic Mat" on page 61
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69

Safety Symbols

Note the meanings of the following symbols that might appear in this document:

Caution – There is a risk of personal injury or equipment damage. To avoid personal injury and equipment damage, follow the instructions.

Caution – Hot surface. Avoid contact. Surfaces are hot and might cause personal injury if touched.

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

Related Information

- "Safety Information" on page 59

Electrostatic Discharge Safety Measures

Electrostatic discharge (ESD) sensitive devices, such as the motherboard, PCI cards, hard drives, and memory modules require special handling.

Caution – Circuit boards and hard drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static electricity from clothing or the work environment can destroy the components located on these boards. Do not touch the components along their connector edges.

Caution – You must disconnect both power supplies before servicing any of the components documented in this chapter.

Related Information

- "Safety Information" on page 59
- "Antistatic Wrist Strap" on page 61
- "Antistatic Mat" on page 61

Antistatic Wrist Strap

Wear an antistatic wrist strap and use an antistatic mat when handling components such as hard drive assemblies, circuit boards, or PCI cards. When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Following this practice equalizes the electrical potentials between you and the server.

Note – An antistatic wrist strap is no longer included in the accessory kit for the SPARC Enterprise T5440 servers. However, antistatic wrist straps are still included with options.

Antistatic Mat

Place ESD-sensitive components such as motherboards, memory, and other PCBs on an antistatic mat.

Required Tools

The SPARC Enterprise T5440 server can be serviced with the following tools:

- Antistatic wrist strap
- Antistatic mat
- No. 1 Phillips screwdriver
- No. 2 Phillips screwdriver
- 7 mm hex driver
- No. 1 flat-blade screwdriver (battery removal)
- Pen or pencil (power on server)

▼ Obtain the Chassis Serial Number

To obtain support for your system, you need your chassis serial number.

- **The chassis serial number is located on a sticker that is on the front of the server and another sticker on the side of the server.**

▼ Obtain the Chassis Serial Number Remotely

- **Use the ILOM** `show /SYS` **command to obtain the chassis serial number.**

```
-> show /SYS

/SYS
   Targets:
        SERVICE
        LOCATE
        ACT
        PS_FAULT
        TEMP_FAULT
```

```
        FAN_FAULT
...
   Properties:
        type = Host System
        keyswitch_state = Normal
        product_name = T5440
        product_serial_number = 0723BBC006
        fault_state = OK
        clear_fault_action = (none)
        power_state = On

   Commands:
        cd
        reset
        set
        show
        start
        stop
```

Powering Off the System

Note – Additional information about powering off the system is located in the *SPARC Enterprise T5440 Server Administration Guide*.

Related Information

- "Power Off From the Command Line" on page 64
- "Power Off – Graceful Shutdown" on page 64
- "Power Off – Emergency Shutdown" on page 65

▼ Power Off From the Command Line

1. **Shut down the Solaris OS.**

   At the Solaris prompt, type:

```
# shutdown -g0 -i0 -y
# svc.startd: The system is coming down. Please wait.
svc.startd: 91 system services are now being stopped.
Jun 12 19:46:57 wgs41-58 syslogd: going down on signal 15
svc.stard: The system is down.
syncing file systems...done
Program terminated
r)eboot o)k prompt, h)alt?
```

2. **Switch from the system console prompt to the service processor console prompt. Type:**

```
ok #.
->
```

3. **From the ILOM -> prompt, type:**

```
-> stop /SYS
Are you sure you want to stop /SYS (y/n)? y
Stopping /SYS

->
```

Note – To perform an immediate shutdown, use the `stop -force -script /SYS` command. Ensure that all data is saved before entering this command.

▼ Power Off – Graceful Shutdown

- **Press and release the Power button.**

  If necessary, use a pen or pencil to press the Power button.

▼ Power Off – Emergency Shutdown

Caution – All applications and files will be closed abruptly without saving changes. File system corruption might occur.

- **Press and hold the Power button for four seconds.**

▼ Disconnect Power Cords From the Server

- **Unplug all power cords from the server.**

Caution – Because 3.3v standby power is always present in the system, you must unplug the power cords before accessing any cold-serviceable components.

Extending the Server to the Maintenance Position

The following components can be serviced with the server in the maintenance position:

- Fan trays
- CMP/memory modules
- FB-DIMMs
- PCIe/XAUI cards
- Service processor
- Power supply backplane
- Hard drive backplane

Related Information

- "Front Panel Diagram" on page 3
- "Rear Panel Diagram" on page 5
- "Extend the Server to the Maintenance Position" on page 66

▼ Extend the Server to the Maintenance Position

1. **(Optional) Use the `set /SYS/LOCATE` command from the `->` prompt to locate the system that requires maintenance.**

```
-> set /SYS/LOCATE value=Fast_Blink
```

   Once you have located the server, press the Locator LED and button to turn it off.

2. **Verify that no cables will be damaged or will interfere when the server is extended.**

   Although the cable management arm (CMA) that is supplied with the server is hinged to accommodate extending the server, you should ensure that all cables and cords are capable of extending.

3. **From the front of the server, release the two slide release latches (**FIGURE: Extending the Server Into the Maintenance Position on page 66**).**

   Squeeze the slide rail locks to release the slide rails.

FIGURE: Extending the Server Into the Maintenance Position

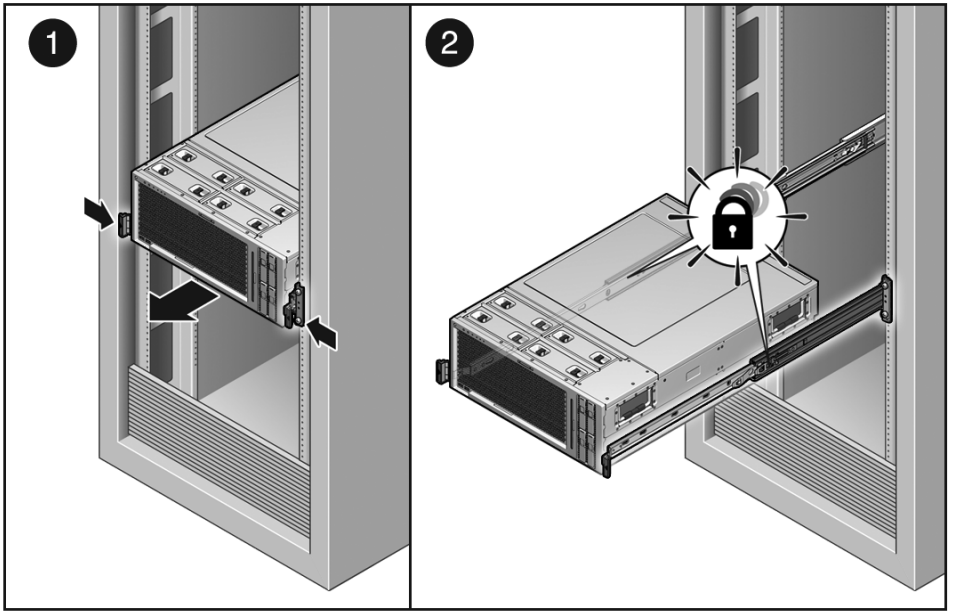


Figure Legend

1	Slide Rail Lock
2	Inner Rail Release Button

4. **While squeezing the slide rail locks, slowly pull the server forward until it is locked in the service position.**

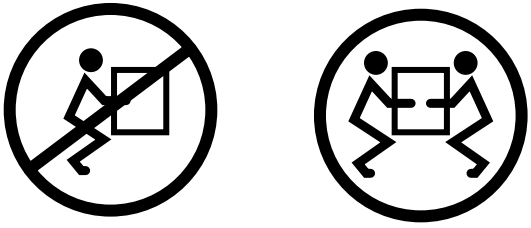
Removing the Server From the Rack

The server must be removed from the rack to remove or install the following components:

- Motherboard

Caution – Two people must dismount and carry the chassis.

FIGURE: Lift Warning



Related Information

- "Front Panel Diagram" on page 3
- "Rear Panel Diagram" on page 5
- "Extend the Server to the Maintenance Position" on page 66
- "Remove the Server From the Rack" on page 67

▼ Remove the Server From the Rack

1. **Disconnect all the cables and power cords from the server.**
2. **Extend the server to the maintenance position.**

   See "Extending the Server to the Maintenance Position" on page 65.

3. **Disconnect the CMA.**

   Pull out the retention pin that secures the cable management arm (CMA) to the rack rail (FIGURE: Removing the Server From the Rack on page 68). Slide the CMA out of the end of the inner glide. The CMA is still attached to the cabinet, but the server is now disconnected from the CMA.

FIGURE: Removing the Server From the Rack

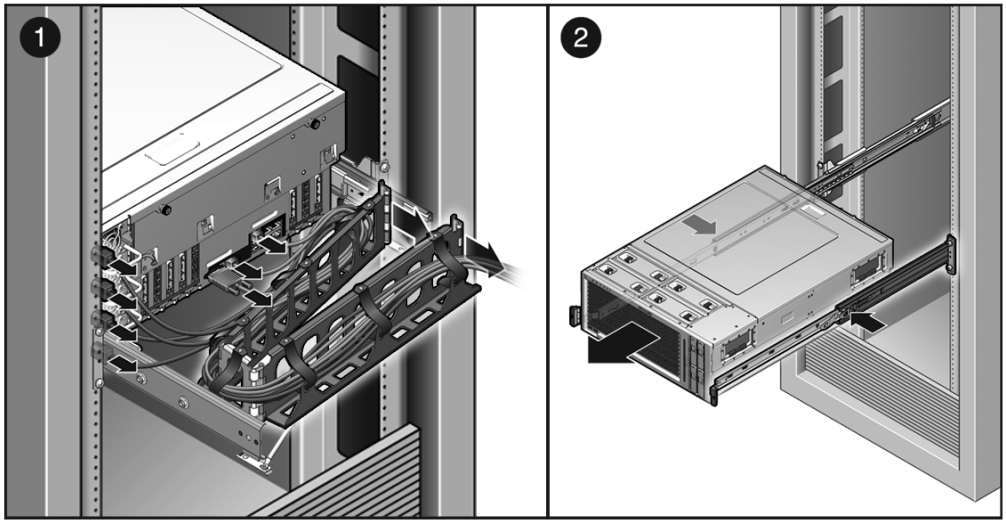


Figure Legend

1	Disconnect system cables and CMA.
2	Press inner rail release buttons to remove the server from the rack.

Caution – Use two people to dismount and carry the chassis.

4. **From the front of the server, press inner rail release buttons and pull the server forward until it is free of the rack rails.**

5. **Set the server on a sturdy work surface.**

Performing Electrostatic Discharge – Antistatic Prevention Measures

Related Information

- "Electrostatic Discharge Safety Measures" on page 61
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69

▼ Perform Electrostatic Discharge – Antistatic Prevention Measures

1. **Prepare an antistatic surface to set parts on during the removal, installation, or replacement process.**

   Place ESD-sensitive components such as the printed circuit boards on an antistatic mat. The following items can be used as an antistatic mat:

   - Antistatic bag used to wrap a replacement part
   - ESD mat
   - A disposable ESD mat (shipped with some replacement parts or optional system components)

2. **Attach an antistatic wrist strap.**

   When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis.

Removing the Top Cover

▼ Remove the Top Cover

Before you begin, complete these tasks:

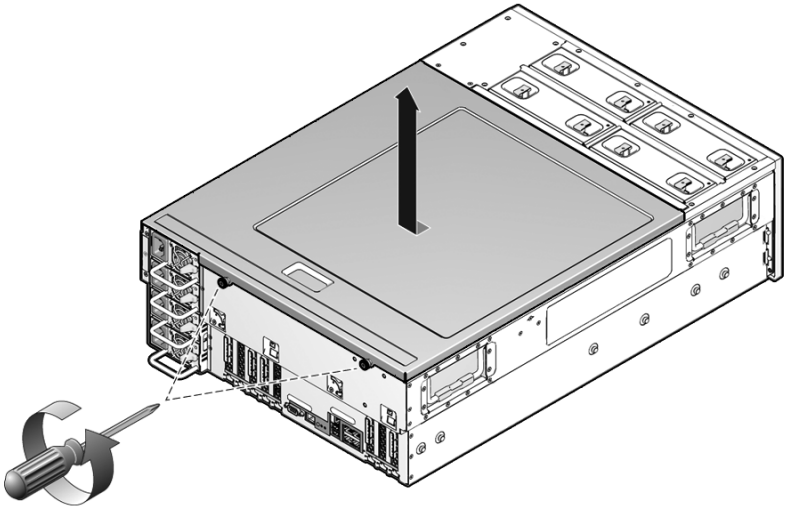
- Read the section, "Safety Information" on page 59.
- Power off the server using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69

1. **Loosen the two captive No. 2 Phillips screws at the rear edge of the top panel.**
2. **Slide the top cover to the rear about 0.5 inch (12.7 mm).**
3. **Remove the top cover.**

   Lift up and remove the cover.

Caution – If the top cover is removed before the server is powered off, the server will immediately disable the front panel Power button and shut down. After such an event, you must replace the top cover and use the `poweron` command to power on the server. See "Power On the Server" on page 153.

FIGURE: Removing the Top Cover



Servicing Customer-Replaceable Units

These topics describe how to service customer-replaceable units (CRUs) in the SPARC Enterprise T5440 server.

Topic	Links
Read and learn about components which can be serviced while the system is in operation.	"Hot-Pluggable and Hot-Swappable Devices" on page 72
Remove, install and add hard drives.	"Servicing Hard Drives" on page 72
Remove and install fan trays.	"Servicing Fan Trays" on page 81
Remove and install power supplies.	"Servicing Power Supplies" on page 85
Remove, install, and add PCIe cards.	"Servicing PCIe Cards" on page 92
Remove, install, and add CMP or memory modules.	"Servicing CMP/Memory Modules" on page 98
Remove, install, and add FB-DIMMs.	"Servicing FB-DIMMs" on page 104
Exploded views of CRUs	"Customer-Replaceable Units" on page 174

Related Information

- "Servicing Field-Replaceable Units" on page 115

Hot-Pluggable and Hot-Swappable Devices

Hot-pluggable devices are those devices that you can remove and install while the server is running. However, you must perform administrative tasks before or after installing the hardware (for example, mounting a hard drive). In the SPARC Enterprise T5440 server, the following devices are hot-pluggable:

- Hard drives

Hot-swappable devices are those devices that can be removed and installed while the server is running without affecting the rest of the server's capabilities. In the SPARC Enterprise T5440 server, the following devices are hot-swappable:

- Fan trays
- Power supplies

Note – The chassis-mounted hard drives can be hot-swappable, depending on how they are configured.

Related Information

- "Servicing Hard Drives" on page 72
- "Servicing Fan Trays" on page 81
- "Servicing Power Supplies" on page 85
- "Server Components" on page 173

Servicing Hard Drives

The hard drives in the server are hot-pluggable, but this capability depends on how the hard drives are configured. To hot-plug a drive you must take the drive offline before you can safely remove it. Taking a drive offline prevents any applications from accessing it, and removes the logical software links to it.

Caution – You must use hard drives designed for this server, which have a vented front panel to allow adequate airflow to internal system components. Installing inappropriate hard drives could result in an overtemperature condition.

The following situations inhibit your ability to hot-plug a drive:

- If the hard drive contains the operating system, and the operating system is not mirrored on another drive.
- If the hard drive cannot be logically isolated from the online operations of the server.

If your drive falls into one of these conditions, you must power off the server before you replace the hard drive.

Related Information

- "Identifying Server Components" on page 1
- "Managing Faults" on page 9
- "Powering Off the System" on page 63
- "Hot-Pluggable and Hot-Swappable Devices" on page 72
- "Hard Drive Device Identifiers" on page 79
- "Hard Drive LEDs" on page 80
- "Server Components" on page 173

▼ Remove a Hard Drive (Hot-Plug)

Removing a hard drive from the server is a three-step process. You must first identify the drive you want to remove, unconfigure that drive from the server, and then manually remove the drive from the chassis.

Note – See "Hard Drive Device Identifiers" on page 79 for information about identifying hard drives.

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.

1. **At the Solaris prompt, issue the `cfgadm -al` command to list all drives in the device tree, including drives that are not configured. Type:**

```
# cfgadm -al
```

   This command should identify the `Ap_id` for the hard drive you wish to remove, as in CODE EXAMPLE: Sample `Ap_id` Output on page 75.

2. **Issue the `cfgadm -c unconfigure` command to unconfigure the disk.**

   For example, type:

```
# cfgadm -c unconfigure c0::dsk/d1t1d1
```

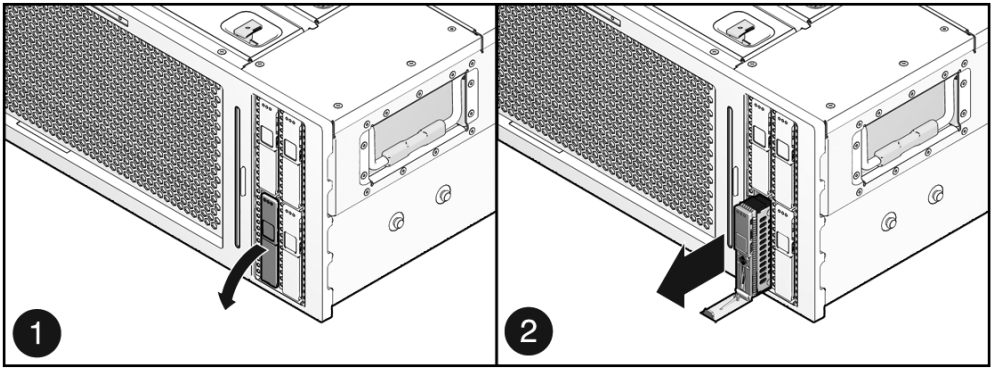
   where `c0:dsk/c0t1d1` is the disk that you are trying to unconfigure.

3. **Wait until the blue Ready-to-Remove LED lights.**

   This LED will help you identify which drive is unconfigured and can be removed.

4. **On the drive you plan to remove, push the hard drive release button to open the latch (FIGURE: Removing a Hard Drive on page 74).**

FIGURE: Removing a Hard Drive



Caution – The latch is not an ejector. Do not bend the latch too far. Doing so can damage the latch.

5. **Grasp the latch and pull the drive out of the drive slot.**

CODE EXAMPLE: Sample `Ap_id` Output

```
Ap_id                          Type         Receptacle   Occupant     Condition
c0                              scsi-bus     connected    configured   unknown
c0::dsk/d1t0d0                 disk         connected    configured   unknown
c0::dsk/d1t1d0                 disk         connected    configured   unknown
usb0/1                         unknown      empty        unconfigured ok
usb0/2                         unknown      empty        unconfigured ok
usb0/3                         unknown      empty        unconfigured ok
usb1/1                         unknown      empty        unconfigured ok
usb1/2                         unknown      empty        unconfigured ok
usb1/3                         unknown      empty        unconfigured ok
usb2/1                         unknown      empty        unconfigured ok
usb2/2                         unknown      empty        unconfigured ok
usb2/3                         unknown      empty        unconfigured ok
usb2/4                         unknown      empty        unconfigured ok
usb2/5                         unknown      empty        unconfigured ok
usb2/6                         unknown      empty        unconfigured ok
usb2/7                         unknown      empty        unconfigured ok
usb2/8                         unknown      empty        unconfigured ok
----------------------------
```

▼ Install a Hard Drive (Hot-Plug)

Installing a hard drive into the SPARC Enterprise T5440 servers is a two-step process. You must first install a hard drive into the desired drive slot. Then you must configure that drive to the server.

Perform the following process to install a hard drive.

1. **If necessary, remove the blank panel from the chassis.**

Note – The server might have up to three blank panels covering unoccupied drive slots.

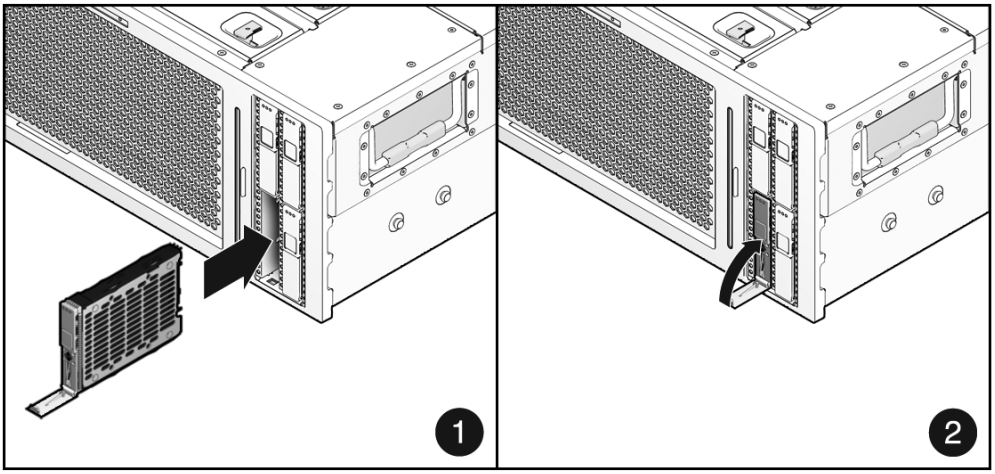
---

2. **Align the replacement drive to the drive slot.**

   Hard drives are physically addressed according to the slot in which they are installed. If you removed an existing hard drive from a slot in the server, you must install the replacement drive in the same slot as the drive that was removed.

3. **Slide the drive into the drive slot until it is fully seated.**

FIGURE: Installing a Hard Drive



4. **Close the latch to lock the drive in place.**

5. **At the Solaris prompt, type the `cfgadm -al` command to list all drives in the device tree, including any drives that are not configured. Type:**

```
# cfgadm -al
```

This command should help you identify the `Ap_id` for the hard drive you installed. For an output example refer to CODE EXAMPLE: Sample `Ap_id` Output on page 77.

6. **Type the `cfgadm -c configure` command to configure the disk.**

For example, type:

```
# cfgadm -c configure c0::sd1
```

where `c0::sd1` is the disk that you are trying to configure.

7. **Wait until the blue Ready-to-Remove LED is no longer lit on the drive that you installed.**

8. **At the Solaris prompt, type the `cfgadm -al` command to list all drives in the device tree, including any drives that are not configured. Type:**

```
# cfgadm -al
```

This command should identify the `Ap_id` for the hard drive that you installed. The drive you installed should be is configured.

9. Type the `iostat -E` command. Type:

```
# iostat -E
```

The `iostat -E` command displays information about your system's installed devices such as manufacturer, model number, serial number, size, and system error statistics.

CODE EXAMPLE: Sample `Ap_id` Output

```
Ap_id                          Type         Receptacle   Occupant     Condition
c0                              scsi-bus     connected    configured   unknown
c0::dsk/d1t0d0                 disk         connected    configured   unknown
c0::sd1                        disk         connected    unconfigured unknown
usb0/1                         unknown      empty        unconfigured ok
usb0/2                         unknown      empty        unconfigured ok
usb0/3                         unknown      empty        unconfigured ok
usb1/1                         unknown      empty        unconfigured ok
usb1/2                         unknown      empty        unconfigured ok
usb1/3                         unknown      empty        unconfigured ok
usb2/1                         unknown      empty        unconfigured ok
usb2/2                         unknown      empty        unconfigured ok
usb2/3                         unknown      empty        unconfigured ok
usb2/4                         unknown      empty        unconfigured ok
usb2/5                         unknown      empty        unconfigured ok
usb2/6                         unknown      empty        unconfigured ok
usb2/7                         unknown      empty        unconfigured ok
usb2/8                         unknown      empty        unconfigured ok
--------------------------------
```

▼ Remove a Hard Drive

If you are removing a hard drive as a prerequisite for another service procedure, follow the steps in this section.

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69

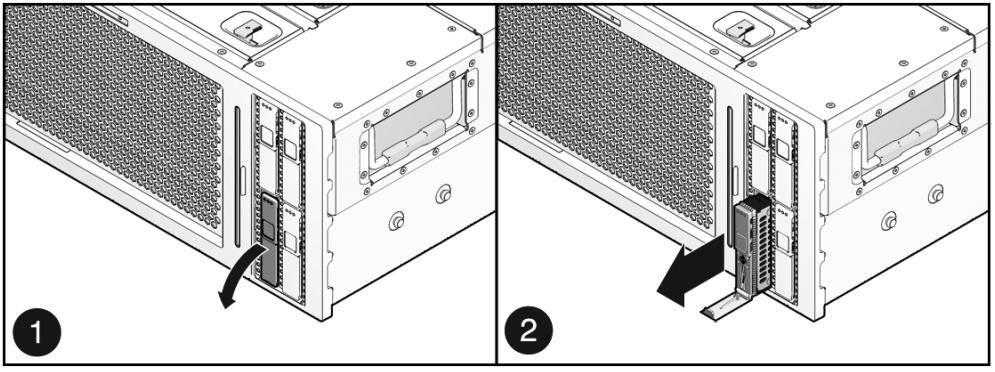
Do the following :

1. Note the location of each hard drive.

Note – You must install each hard drive in the same bay from which it was removed.

2. **Press the hard drive latch release button.**

FIGURE: Removing a Hard Drive



3. **Slide the hard drive out of its bay.**

▼ Install a Hard Drive

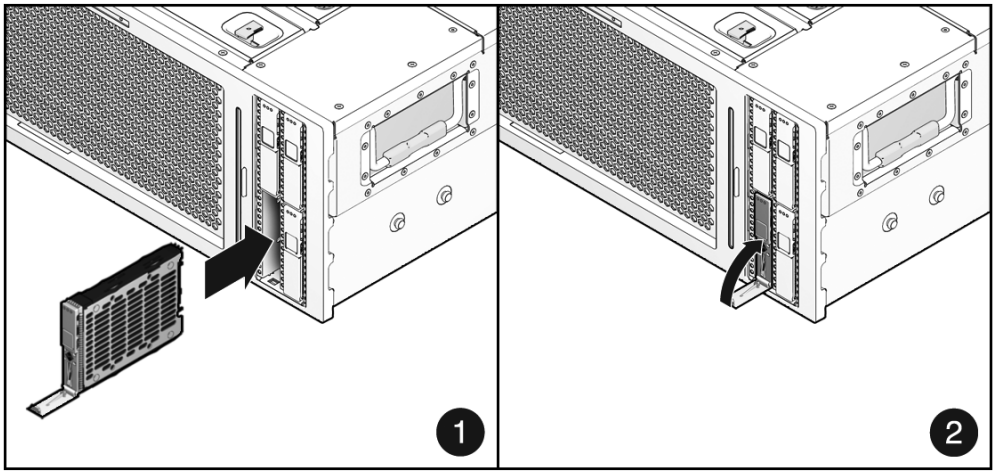
If you are installing a hard drive after servicing another component in the system, do the following:

1. **Align the replacement drive to the drive slot.**

   Hard drives are physically addressed according to the slot in which they are installed. If you removed an existing hard drive from a slot in the server, you must install the replacement drive in the same slot as the drive that was removed.

2. **Slide the drive into the drive slot until it is fully seated.**

FIGURE: Installing a Hard Drive



3. **Close the latch to lock the drive in place.**
4. **If you performed any additional service procedures, see** "Power On the Server" on page 153**.**

Hard Drive Device Identifiers

TABLE: Physical Drive Locations, FRU Names, and Default Drive Path Names on page 79 lists physical drive locations and their corresponding default path names in OpenBoot PROM and Solaris for the SPARC Enterprise T5440 server.

TABLE: Physical Drive Locations, FRU Names, and Default Drive Path Names

Device	Device Identifier	OpenBoot PROM/Solaris Default Drive Path Name
HDD0	/SYS/HDD0	c0::dsk/d1t0d0
HDD1	/SYS/HDD1	c0::dsk/d1t1d0
HDD2	/SYS/HDD2	c0::dsk/d1t2d0
HDD3	/SYS/HDD3	c0::dsk/d1t3d0

Note – Hard drive names in ILOM messages are displayed with the full FRU name, such as /SYS/HDD0.

Related Information

- "Hard Drive LEDs" on page 80

Hard Drive LEDs

FIGURE: Hard Drive LEDs

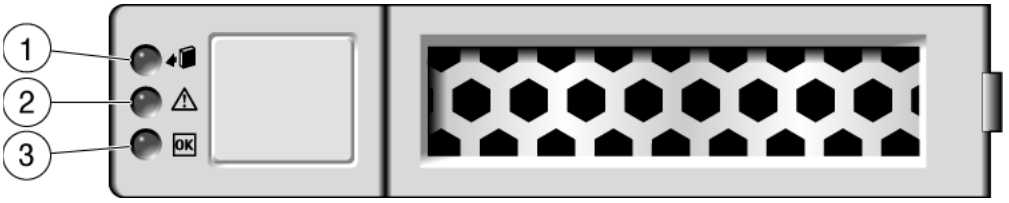


TABLE: Hard Drive Status LEDs

No.	LED		Color	Notes
1	Ready -to-Remove		Blue	This LED is lit to indicate that a hard drive can be removed safely during a hot-plug operation.
2	Service Required		Amber	This LED is lit when the system is running and the hard drive is faulty.
3	OK/Activity	OK	Green	This LED lights when data is being read from or written to the hard drive.

The front and rear panel Service Required LEDs are also lit if the system detects a hard drive fault.

Related Information

- "Hard Drive Device Identifiers" on page 79

Servicing Fan Trays

Four fan trays are located toward the front of the server, arranged in two N+1 redundant pairs. Each fan tray contains a fan mounted in an integrated, hot-swappable CRU. If a fan tray fails, replace it as soon as possible to maintain server availability.

Caution – Hazardous moving parts. Unless the power to the server is completely shut down, the only service permitted in the fan compartment is the replacement of the fan trays by trained personnel.

Related Information

- "Identifying Server Components" on page 1
- "Managing Faults" on page 9
- "Powering Off the System" on page 63
- "Hot-Pluggable and Hot-Swappable Devices" on page 72
- "Fan Tray Device Identifiers" on page 84
- "Fan Tray Fault LED" on page 84
- "Server Components" on page 173

▼ Remove a Fan Tray (Hot-Swap)

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Perform the task, "Extend the Server to the Maintenance Position" on page 66.
- Perform the task, "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69.

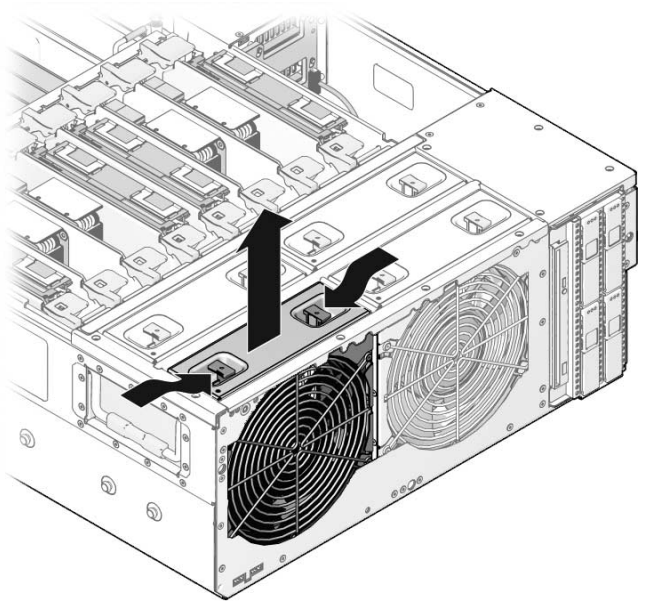
Do the following :

1. **Identify the fan tray to be removed.**

   See "Fan Tray Device Identifiers" on page 84 and "Fan Tray Fault LED" on page 84.

2. **Press the fan tray latches toward the center of the fan tray and pull the fan tray up and out of the system.**

FIGURE: Removing a Fan Tray



▼ Install a Fan Tray (Hot-Swap)

1. **Slide the fan tray into its bay until it locks into place.**

   Ensure that the fan tray is oriented correctly. Airflow in the system is from front to back.

2. **Verify proper fan tray operation.**

   See "Fan Tray Fault LED" on page 84.

Next Steps

If you are replacing a faulty fan tray due to an overtemperature condition, monitor the system to ensure proper cooling.

- "Slide the Server Into the Rack" on page 151
- If you performed any additional service procedures, see "Power On the Server" on page 153.

▼ Remove a Fan Tray

If you are removing the fan trays as a prerequisite for another service procedure, follow the steps in this procedure.

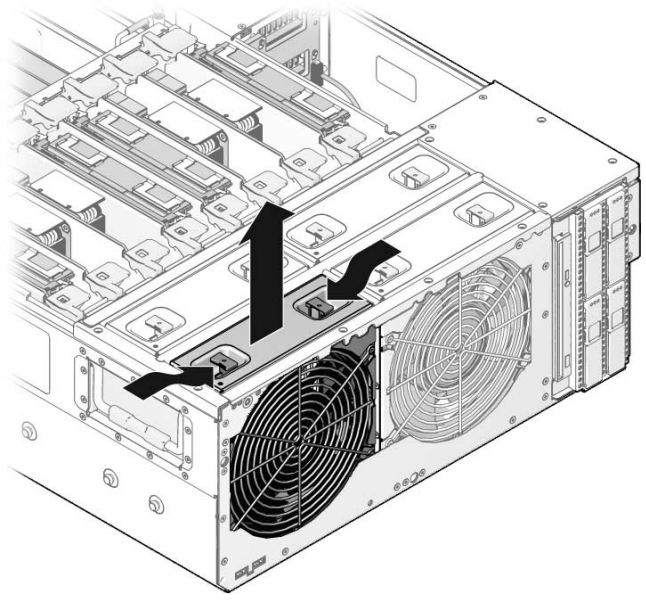
Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- Perform the task, "Extend the Server to the Maintenance Position" on page 66
- Perform the task, "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69

Do the following :

- **Press the fan tray latches toward the center of the fan tray and pull the fan tray up and out of the system.**

FIGURE: Removing a Fan Tray



▼ Install a Fan Tray

1. **Slide each fan tray into its bay until it locks into place.**

   Ensure that the fan tray is oriented correctly. Airflow in the system is from front to back.

2. **Verify proper fan tray operation.**

   See "Fan Tray Fault LED" on page 84.

Next Steps

If you are replacing the fan trays after performing another service procedure, complete these steps.

- "Slide the Server Into the Rack" on page 151
- "Power On the Server" on page 153

Fan Tray Device Identifiers

TABLE: Fan Tray Device Identifiers on page 84 describes the FRU device names for the fan trays in the server.

TABLE: Fan Tray Device Identifiers

Device	Device Identifier
FT0	/SYS/MB/FT0
FT1	/SYS/MB/FT1
FT2	/SYS/MB/FT2
FT3	/SYS/MB/FT3

Related Information

- "Managing Faults" on page 9
- "Hot-Pluggable and Hot-Swappable Devices" on page 72
- "Fan Tray Fault LED" on page 84

Fan Tray Fault LED

Each fan tray contains a Fault LED that is located on the top panel of the server. The LED is visible when you slide the server partially out of the rack.

See TABLE: Fan Tray Fault LED on page 85 for a description of fan tray Fault LED and its function.

TABLE: Fan Tray Fault LED

LED	Color	Notes
Fault	Amber	This LED is lit when the fan tray is faulty.

The front panel Fan Fault LED, and the front and rear panel Service Required LEDs are also lit if the system detects a fan tray fault. In addition, the system Overtemp LED might be lit if a fan fault causes an increase in system operating temperature.

See "Front Panel LEDs" on page 4 and "Rear Panel LEDs" on page 7 for more information about system status LEDs.

Related Information

- "Managing Faults" on page 9
- "Hot-Pluggable and Hot-Swappable Devices" on page 72
- "Fan Tray Fault LED" on page 84

Servicing Power Supplies

The server is equipped with redundant hot-swappable power supplies. Redundant power supplies enable you to remove and replace a power supply without shutting the server down, provided that at least two other power supplies are online and working.

Note – If a power supply fails and you do not have a replacement available, leave the failed power supply installed to ensure proper airflow in the server.

Related Information

- "Identifying Server Components" on page 1
- "Managing Faults" on page 9
- "Hot-Pluggable and Hot-Swappable Devices" on page 72
- "Power Supply Device Identifiers" on page 91

- "Power Supply LED" on page 91
- "Server Components" on page 173
- *SPARC Enterprise T5440 Server Site Planning Guide*

▼ Remove a Power Supply (Hot-Swap)

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

Note – If you are servicing Power Supply 0, you must disconnect the cable management arm support strut.

1. **Identify which power supply requires replacement.**

   An amber LED on a power supply indicates that a failure was detected. In addition, the `show faulty` command indicates which power supply is faulty. See "Detecting Faults" on page 30.

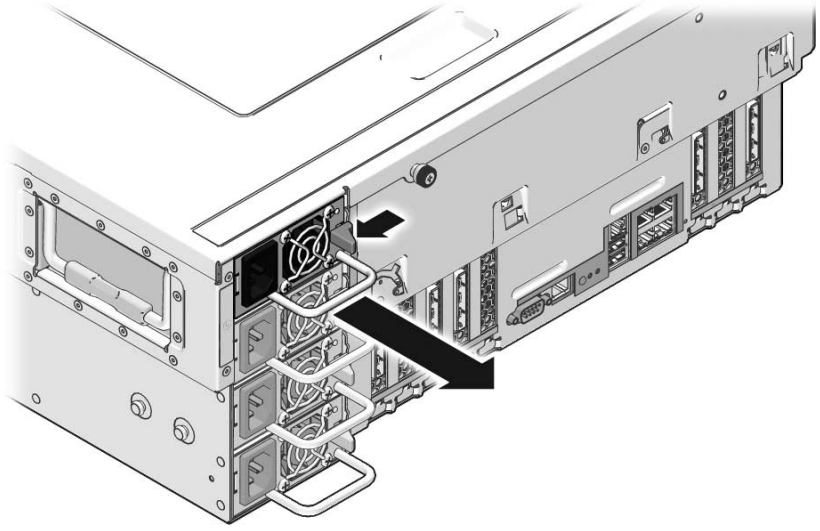
2. **Gain access to the rear of the server where the faulty power supply is located.**

   If necessary, slide the system partially out of the rack to obtain better access to the rear panel.

3. **Disconnect the power cord from the faulty power supply.**

4. **Grasp the power supply handle and press the release latch.**

FIGURE: Removing a Power Supply

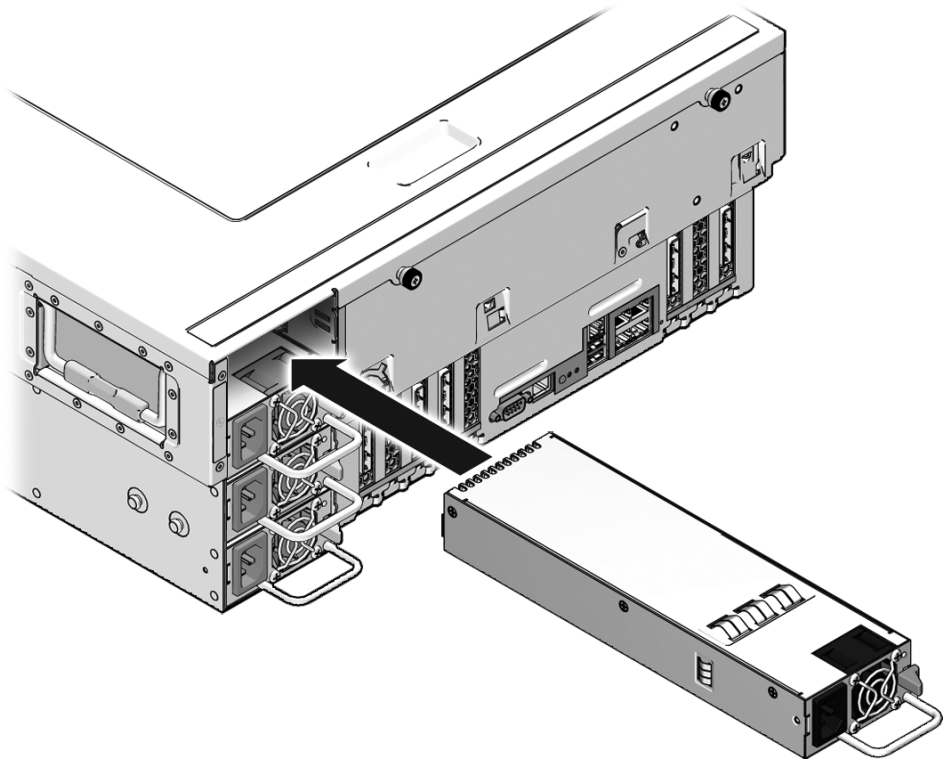


5. **Pull the power supply out of the chassis.**

▼ Install a Power Supply (Hot-Swap)

1. **Align the replacement power supply with the empty power supply bay.**
2. **Slide the power supply into the bay until it is fully seated.**

FIGURE: Installing a Power Supply



3. **Reconnect the power cord to the power supply.**

   Verify that the power supply LED is green or blinking green.

4. **Verify that the system Power Supply Fault LED, and the front and rear Service Required LEDs are not lit.**

Note – See "Front Panel LEDs" on page 4 and "Rear Panel LEDs" on page 7 for more information about identifying and interpreting system LEDs.

---

5. **At the ILOM** `->` **prompt, use the** `show faulty` **command to verify the status of the power supplies.**

▼ Remove a Power Supply

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

If you are removing the power supplies as a prerequisite for another service procedure, follow these steps.

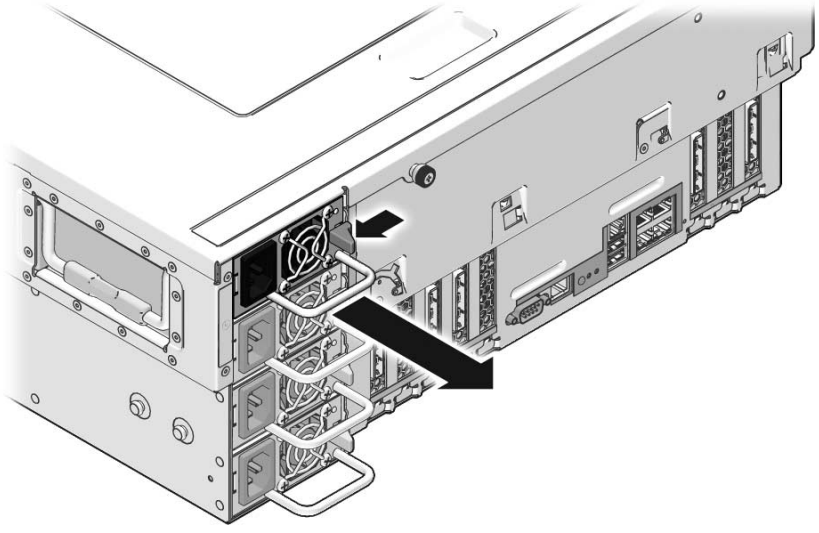
Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Disconnect Power Cords From the Server" on page 65
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69

Note – If you are servicing Power Supply 0, you must disconnect the cable management arm support strut.

1. **Grasp the power supply handle and press the release latch.**

FIGURE: Removing a Power Supply



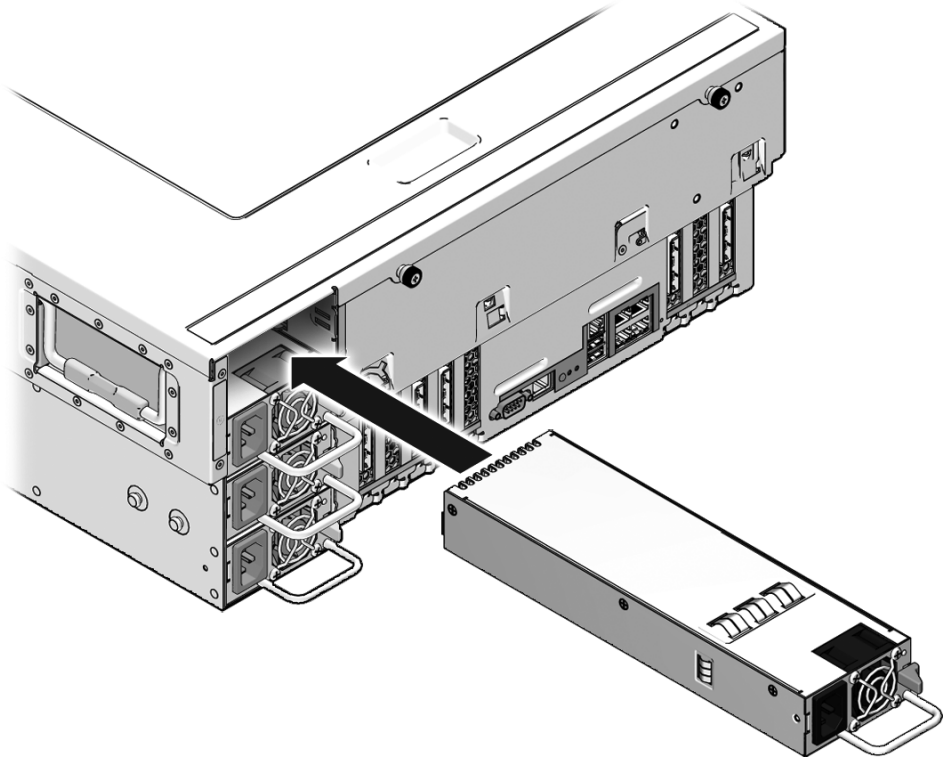
2. **Pull the power supply out of the chassis.**

▼ Install a Power Supply

If you are installing the power supplies following another service tasks, complete these steps.

1. **Align the replacement power supply with the empty power supply bay.**

FIGURE: Installing a Power Supply



2. **Slide the power supply into the bay until it is fully seated.**

Next Steps

- "Connect the Power Cords to the Server" on page 153
- "Power On the Server" on page 153

Power Supply Device Identifiers

TABLE: Power Supply FRU Names on page 91 describes the FRU device names for power supplies in the servers.

TABLE: Power Supply FRU Names

Device	Device Identifier
PS0	/SYS/PS0
PS1	/SYS/PS1
PS2	/SYS/PS2
PS3	/SYS/PS3

Note – Power supply names in ILOM messages are displayed with the full FRU name, such as /SYS/PS0.

Related Information

- "Managing Faults" on page 9
- "Hot-Pluggable and Hot-Swappable Devices" on page 72
- "Power Supply LED" on page 91

Power Supply LED

Each power supply contains a dual-color LED that is visible when looking at the back panel of the system.

See TABLE: Power Supply Status LEDs on page 91 for a description of power supply LED modes and their function, listed from top to bottom.

TABLE: Power Supply Status LEDs

LED State	Meaning	Notes
Off	No AC present	Power supply is unplugged or if no AC power is present.
Blinking green	AC present/system in standby	AC power is present and system is in standby mode.

TABLE: Power Supply Status LEDs *(Continued) (Continued)*

LED State	Meaning	Notes
Green	AC present/system powered on	System is powered on.
Blinking amber	Fault	Voltage overcurrent or other power fault.
Amber	Fault	Internal power supply failure or power supply fan failure.

The following LEDs are lit when a power supply fault is detected:

- Front and rear Service Required LEDs
- Rear PS Failure LED on the bezel of the server
- Fault LED mode on the faulty power supply

The front and rear panel Service Required LEDs are also lit if the system detects a power supply fault.

See "Front Panel LEDs" on page 4 and "Rear Panel LEDs" on page 7 for more information about identifying and interpreting system LEDs.

See "Power Supply LED" on page 91 for specific information about power supply status LEDs.

Related Information

- "Managing Faults" on page 9
- "Hot-Pluggable and Hot-Swappable Devices" on page 72
- "Front Panel LEDs" on page 4
- "Rear Panel LEDs" on page 7

Servicing PCIe Cards

Up to eight low-profile PCIe cards may be installed in the system. All slots are wired to x8 PCIe lanes. Slot 1 and Slot 7 support graphics cards with x16 connectors. Slot 4 and Slot 5 also support 10-Gbyte Ethernet cards (XAUI cards). When a XAUI card is installed, a PCIe card cannot be installed in the same slot.

Related Information

- "PCIe Device Identifiers" on page 96

- "PCIe Slot Configuration Guidelines" on page 97
- "Performing Node Reconfiguration" on page 155

▼ Remove a PCIe Card

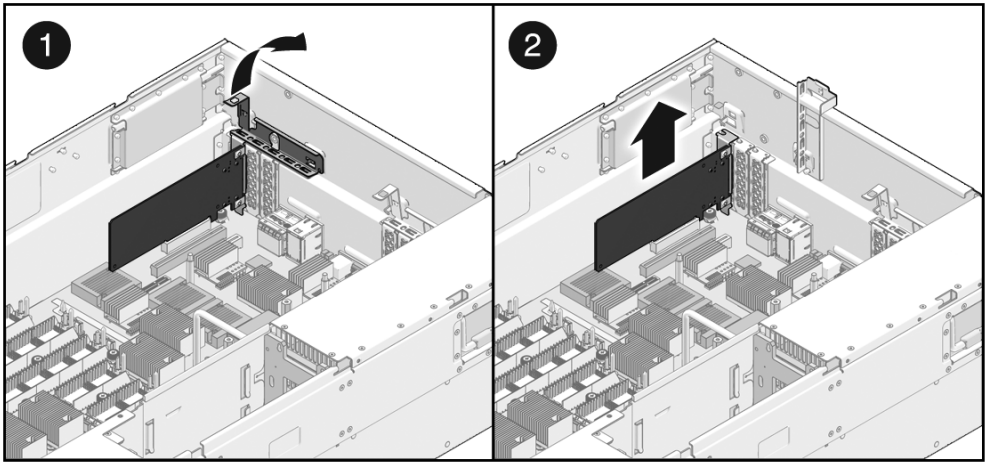
Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69

Do the following :

1. **Identify the PCIe card you want to remove.**
2. **Open the PCIe card latch.**

FIGURE: Removing a PCIe Card

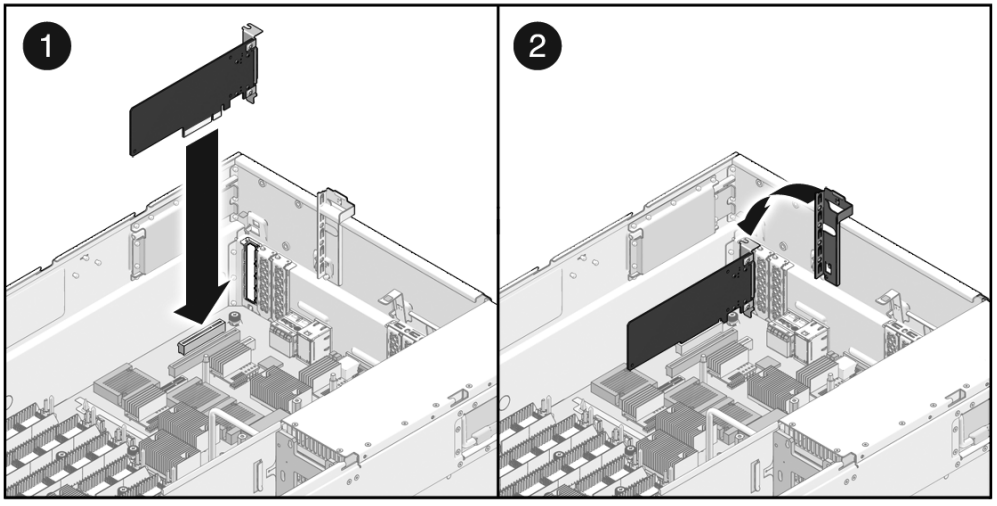


3. **Remove the PCIe card the system.**
4. **Place the PCIe card on an antistatic mat.**
5. **If you are not replacing the PCIe card, install a PCIe filler panel in its place.**
6. **Close the PCIe card latch.**

▼ Install a PCIe Card

1. **Identify the correct slot for installation.**
2. **Open the PCIe card latch.**

FIGURE: Installing a PCIe Card



3. **Insert the PCIe card into its slot.**
4. **Close the PCIe card latch.**

Next Steps

- "Install the Top Cover" on page 150
- "Slide the Server Into the Rack" on page 151
- "Power On the Server" on page 153

▼ Add a PCIe Card

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Disconnect Power Cords From the Server" on page 65
- "Extend the Server to the Maintenance Position" on page 66

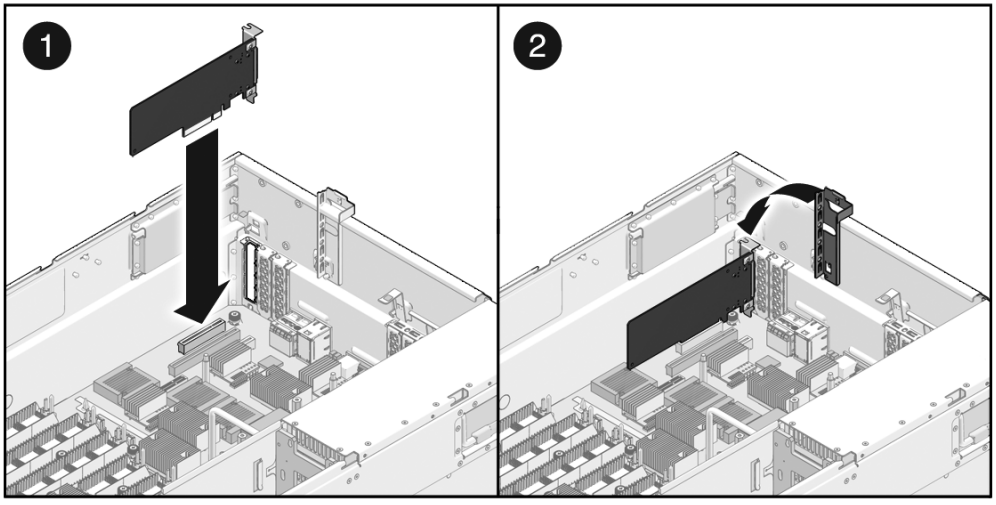
- “Perform Electrostatic Discharge – Antistatic Prevention Measures” on page 69
- “Remove the Top Cover” on page 69

1. **Identify the correct slot for installation.**

   See “PCIe Device Identifiers” on page 96 and “PCIe Slot Configuration Guidelines” on page 97.

2. **Open the PCIe card latch.**
3. **Remove the PCIe filler panel.**
4. **Insert the PCIe card into its slot.**

FIGURE: Installing a PCIe Card



5. **Close the PCIe card latch.**

Next Steps

- “Install the Top Cover” on page 150
- “Slide the Server Into the Rack” on page 151
- “Power On the Server” on page 153

PCIe Device Identifiers

TABLE: PCIe Device Identifiers on page 96 describes device and device identifiers for PCIe cards. Device identifiers are case-sensitive.

TABLE: PCIe Device Identifiers

Device	Device Identifier	Notes
PCIe0	/SYS/MB/PCIE0	x8 slot
PCIe1	/SYS/MB/PCIE1	x16 slot operating at x8
PCIe2	/SYS/MB/PCIE2	x8 slot
PCIe3	/SYS/MB/PCIE3	x8 slot
PCIe4 (XAUI0)	/SYS/MB/PCIE4 or /SYS/MB/XAUI0	x8 slot; shared with XAUI slot
PCIe5 (XAUI1)	/SYS/MB/PCIE5 or /SYS/MB/XAUI1	x8 slot; shared with XAUI slot
PCIe6	/SYS/MB/PCIE6	x16 slot operating at x8
PCIe7	/SYS/MB/PCIE7	x8 slot

Note – PCIe names in ILOM messages are displayed with the full FRU name, such as /SYS/MB/PCIE0.

Note – In the Solaris OS, PCIe slot addresses are associated with CMP modules. The PCIe slot address in the Solaris OS might change if you add or remove CMP modules, or if a CMP module is brought offline. For more information, see the *SPARC Enterprise T5440 Server Product Notes*.

Related Information

- "Managing Faults" on page 9
- "PCIe Slot Configuration Guidelines" on page 97
- "System Bus Topology" on page 162
- "Performing Node Reconfiguration" on page 155

PCIe Slot Configuration Guidelines

Use the guidelines in TABLE: Supported CMP/Memory Module Configurations on page 104 to spread the load evenly across CMP/memory modules. If a slot is already populated with a device, install a new device in the next available slot, in the order indicated.

TABLE: PCIe Slot Configuration Guidelines

PCIe/XAUI Card Type	Number of CMP/Memory Modules	Installation Order	Notes
10 GBit Ethernet (XAUI) card	1, 2, 3 or 4	Slot 4, 5	Install XAUI cards first.
External I/O Expansion Unit PCIe Link card	2	Slot 0, 4, 1, 5	Maximum of 4 cards; install in order shown.
	4	Slot 0, 4, 2, 6, 1, 5, 3, 7	Maximum of 8 cards; install in order shown.
All other devices*	2	Slot 0, 4, 1, 5, 2, 6, 3, 7	Maximum of 8 cards; install in order shown.
	4	Slot 0, 4, 2, 6, 1, 5, 3, 7	Maximum of 8 cards; install in order shown.

* These are guidelines to spread out the I/O load across multiple CMP/memory module pairs. These are not configuration restrictions.

External I/O Expansion Unit PCIe Link cards must be placed in a PCIe slot with a CMP/memory module pair present as follows:

- PCIe Slots 0 and 1 require CMP/Memory pair 0.
- PCIe Slots 4 and 5 require CMP/Memory pair 1.
- PCIe Slots 2 and 3 require CMP/Memory pair 2.
- PCIe Slots 6 and 7 require CMP/Memory pair 3.

Related Information

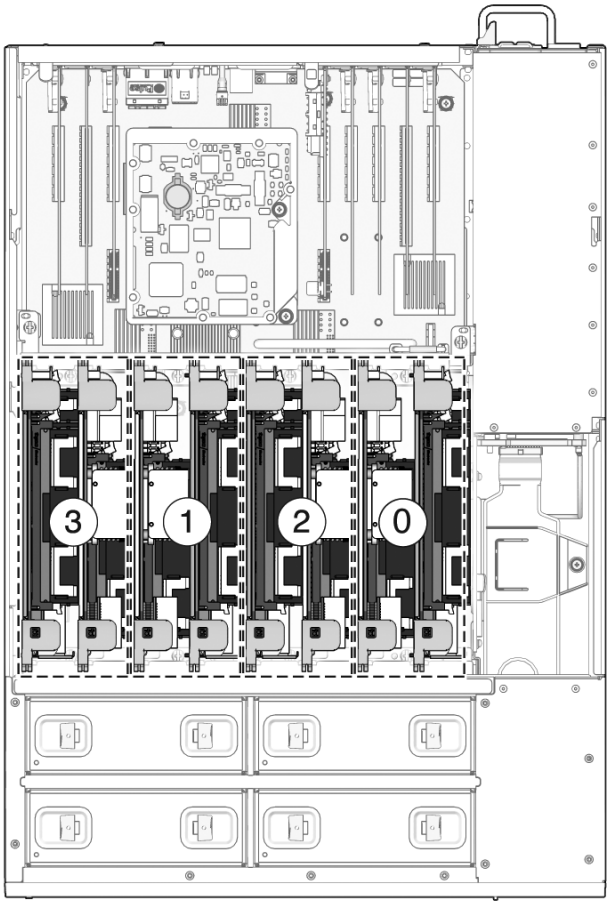
- "PCIe Device Identifiers" on page 96
- "System Bus Topology" on page 162
- "I/O Fabric in 2P Configuration" on page 164
- "I/O Fabric in 4P Configuration" on page 165

Servicing CMP/Memory Modules

Up to four CMP/memory modules can be installed in the system. Each CMP module is paired with a memory module. CMP modules and memory modules are keyed uniquely to prevent incorrect insertion into the wrong type of slot.

A faulty CMP or memory module is indicated with an alluminated fault LED. An alluminated module LED also might indicate a faulty FB-DIMM on that module.

FIGURE: CMP/Memory Module Pairs



Related Information

- "CMP and Memory Module Device Identifiers" on page 103
- "Supported CMP/Memory Module Configurations" on page 104
- "I/O Connections to CMP/Memory Modules" on page 156
- "Reconfiguring I/O Device Nodes" on page 158
- "Servicing FB-DIMMs" on page 104
- "System Bus Topology" on page 162
- "I/O Fabric in 2P Configuration" on page 164
- "I/O Fabric in 4P Configuration" on page 165

▼ Remove a CMP/Memory Module

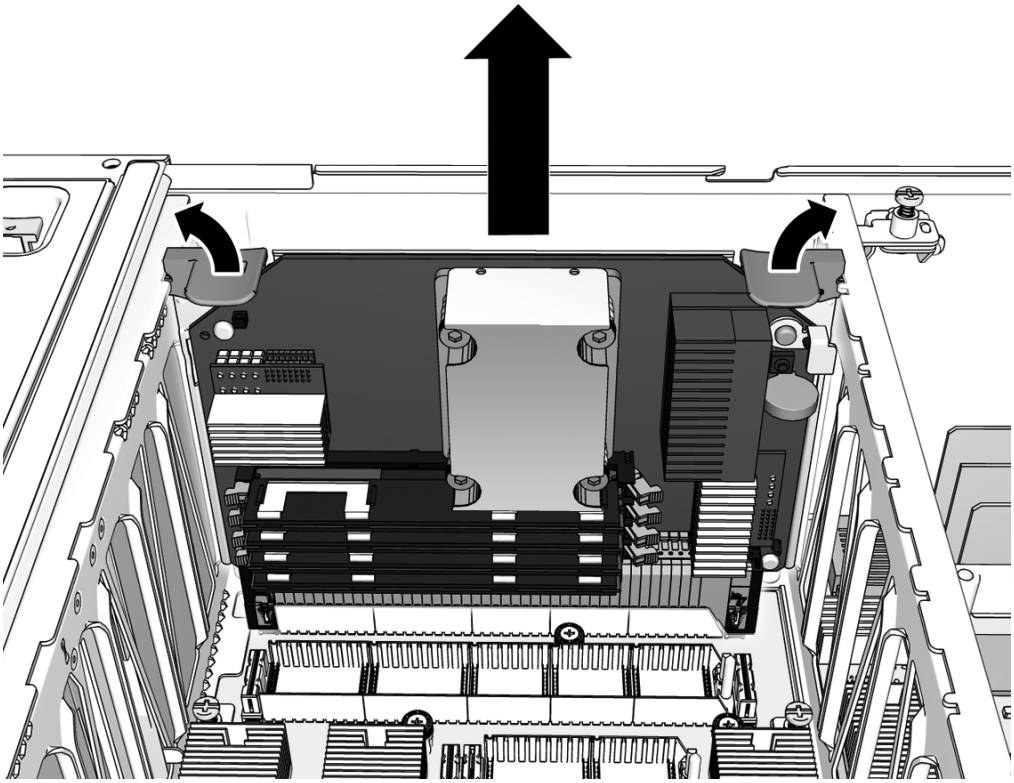
Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69

Do the following :

1. **Identify the module you want to remove.**
2. **Rotate the ejector levers up and away from the module.**

FIGURE: Removing a CMP Module



3. **Slide the module up and out of the system.**
4. **Place the module on an antistatic mat.**

▼ Install a CMP/Memory Module

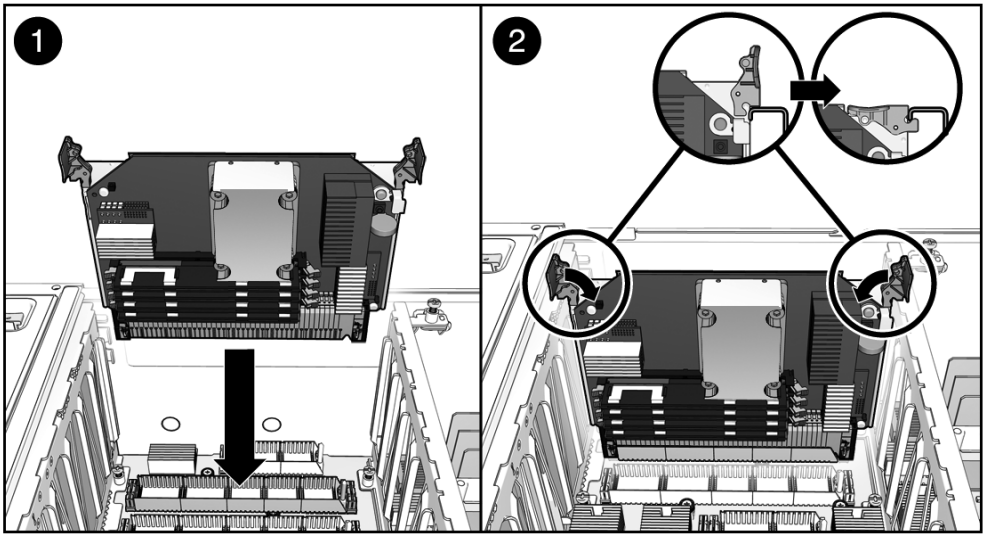
Note – If you are replacing a faulty CMP or memory module, you must transfer the FB-DIMMs on the faulty module to the replacement module. Replacement CMP/memory modules do not include FB-DIMMs.

For more information about installing FB-DIMMs, see "Servicing FB-DIMMs" on page 104

1. **Identify the correct slot for installation.**

2. **Slide the module down into its slot.**

FIGURE: Installing a CMP/Memory Module



3. **Rotate the ejector levers down to secure the module into place.**

Next Steps

- "Install the Top Cover" on page 150
- "Slide the Server Into the Rack" on page 151
- "Power On the Server" on page 153

▼ Add a CMP/Memory Module

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69

Do the following :

1. **Identify the correct slot for installation.**

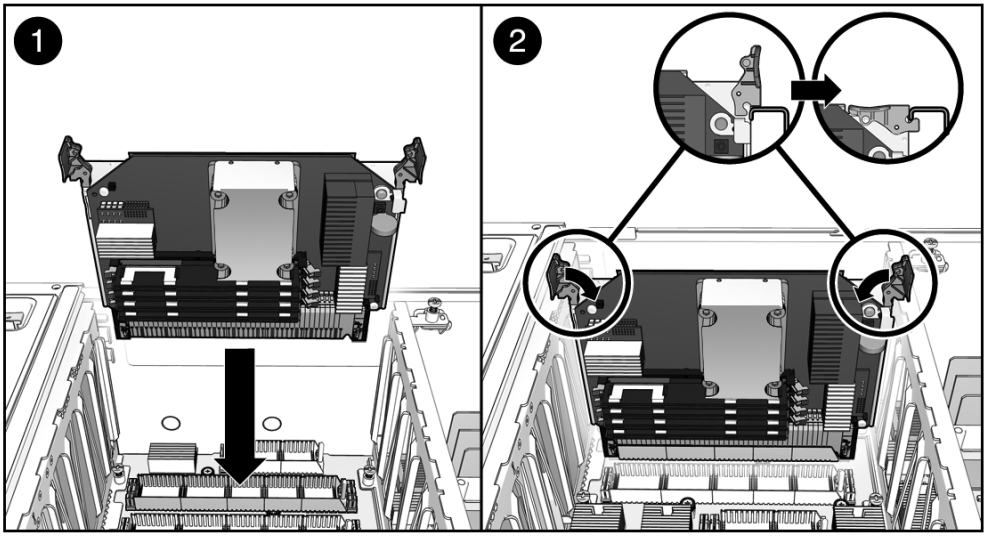
2. **Remove the air baffle.**

   Squeeze the air baffle latches toward each other and lift the air baffle straight up and out of the chassis.

3. **If you are installing the module into a previously empty slot, remove the plastic connector cover on the motherboard.**

4. **Slide the module down into its slot.**

FIGURE: Installing a CMP Module



5. **Rotate the ejector levers down to secure the module into place.**

Next Steps

- "Install the Top Cover" on page 150
- "Slide the Server Into the Rack" on page 151
- "Power On the Server" on page 153

CMP and Memory Module Device Identifiers

TABLE: CMP/Memory Module Device Identifier on page 103 describes device, device identifiers, and supported configurations for CMP and memory modules. Device identifiers are case-sensitive.

TABLE: CMP/Memory Module Device Identifier

Device	Device Identifier
CMP0	/SYS/MB/CPU0/CMP0
MEM0	/SYS/MB/MEM0/CMP0
CMP1	/SYS/MB/CPU1/CMP1
MEM1	/SYS/MB/MEM1/CMP1
CMP2	/SYS/MB/CPU2/CMP2
MEM2	/SYS/MB/MEM2/CMP2
CMP3	/SYS/MB/CPU3/CMP3
MEM3	/SYS/MB/MEM3/CMP3

Note – CMP and memory module names in ILOM messages are displayed with the full FRU name, such as `/SYS/MB/CPU0`.

Related Information

- "Managing Faults" on page 9
- "Supported FB-DIMM Configurations" on page 110
- "Performing Node Reconfiguration" on page 155

Supported CMP/Memory Module Configurations

TABLE: Supported CMP/Memory Module Configurations on page 104 shows the supported CMP/memory module configurations, as viewed from the front of the server.

TABLE: Supported CMP/Memory Module Configurations

Configuration	CMP3 MEM3	CMP1 MEM1	CMP2 MEM2	CMP0 MEM0
One CMP/memory pair				X
Two CMP/memory pairs		X		X
Three CMP/memory pairs		X	X	X
Four CMP/memory pairs (full configurations)	X	X	X	X

Related Information

- "CMP and Memory Module Device Identifiers" on page 103
- "Performing Node Reconfiguration" on page 155

Servicing FB-DIMMs

Up to 16 FB-DIMMs can be installed in each CMP/memory module pair.

Related Information

- "Managing Faults" on page 9
- "Remove FB-DIMMs" on page 105
- "Install FB-DIMMs" on page 105
- "Verify FB-DIMM Replacement" on page 106
- "Add FB-DIMMs" on page 109
- "Supported FB-DIMM Configurations" on page 110
- "FB-DIMM Device Identifiers" on page 112
- "FB-DIMM Fault Button Locations" on page 113
- "Servicing CMP/Memory Modules" on page 98
- "Performing Node Reconfiguration" on page 155

▼ Remove FB-DIMMs

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69
- "Remove a CMP/Memory Module" on page 99

Do the following:

1. **If you are removing a faulty FB-DIMM, determine which FB-DIMM you want to remove.**

   a. **Press the FB-DIMM fault button.**

      See "FB-DIMM Fault Button Locations" on page 113.

   b. **Note which FB-DIMM fault LED is illuminated.**

2. **Push down on the ejector tabs on each side of the FB-DIMM until the FB-DIMM is released.**

Caution – FB-DIMMs might be hot. Use caution when servicing FB-DIMMs.

3. **Grasp the top corners of the faulty FB-DIMM and remove it from the CMP/memory module.**
4. **Place the FB-DIMM on an antistatic mat.**
5. **Repeat** Step 2 **through** Step 4 **to remove any additional FB-DIMMs.**

▼ Install FB-DIMMs

1. **Unpackage the replacement FB-DIMMs and place them on an antistatic mat.**

Tip – See "Supported FB-DIMM Configurations" on page 110 for information about configuring the FB-DIMMs.

2. **Ensure that the ejector tabs are in the open position.**

3. **Line up the replacement FB-DIMM with the connector.**

   Align the FB-DIMM notch with the key in the connector. This ensures that the FB-DIMM is oriented correctly.

4. **Push the FB-DIMM into the connector until the ejector tabs lock the FB-DIMM in place.**

   If the FB-DIMM does not easily seat into the connector, verify that the orientation of the FB-DIMM is correct. If the orientation is reversed, damage to the FB-DIMM might occur.

5. **Repeat** Step 2 **through** Step 4 **until all replacement FB-DIMMs are installed.**

Next Steps

- "Install a CMP/Memory Module" on page 100
- "Install the Top Cover" on page 150
- "Slide the Server Into the Rack" on page 151
- "Power On the Server" on page 153

▼ Verify FB-DIMM Replacement

1. **Access the ILOM -> prompt.**

   Refer to the *Integrated Lights Out Manager 3.0 Supplement for SPARC Enterprise T5440 Server* for instructions.

2. **Run the** `show faulty` **command to determine how to clear the fault.**

   The method you use to clear a fault depends on how the fault is identified by the `showfaults` command.

   Examples:

   - If the fault is a *host-detected fault* (displays a UUID), continue to Step 3. For example:

```
-> show faulty
Target               | Property                | Value
---------------------+-------------------------+--------------------------------
/SP/faultmgmt/0      | fru                     | /SYS/MB/CPU0/CMP0/BR0/CH1/D0
/SP/faultmgmt/0      | timestamp               | Dec 14 22:43:59
/SP/faultmgmt/0/     | sunw-msg-id             | SUN4V-8000-DX
faults/0             |                         |
/SP/faultmgmt/0/     | uuid                    | 3aa7c854-9667-e176-efe5-e487e520
faults/0             |                         | 7a8a
/SP/faultmgmt/0/     | timestamp               | Dec 14 22:43:59
faults/0             |                         |
```

- In most cases, if the fault was detected by POST and resulted in the FB-DIMM being disabled (such as the following example), the replacement of the faulty FB-DIMM is detected when the service processor is power cycled. In this case, the fault is automatically cleared from the system.

```
-> show faulty
Target               | Property                | Value
---------------------+-------------------------+-------------------------------
/SP/faultmgmt/0      | fru                     | /SYS/MB/CPU0/CMP0/BR1/CH0/D0
/SP/faultmgmt/0      | timestamp               | Dec 21 16:40:56
/SP/faultmgmt/0/     | timestamp               | Dec 21 16:40:56 faults/0
/SP/faultmgmt/0/     | sp_detected_fault       | /SYS/MB/CPU0/CMP0/BR1/CH0/D0
faults/0             |                         | Forced fail(POST)
```

If the fault is still displayed by the `show faulty` command, then run the `set` command to enable the FB-DIMM and clear the fault.

Example:

```
-> set /SYS/MB/CPU0/CMP0/BR0/CH0/D0 component_state=Enabled
```

3. Perform the following steps to verify the repair:

a. Set the virtual keyswitch to diag so that POST will run in Service mode.

```
-> set /SYS/keyswitch_state=Diag
Set 'keyswitch_state' to 'Diag'
```

b. Power cycle the system.

```
-> stop /SYS
Are you sure you want to stop /SYS (y/n)? y
Stopping /SYS
-> start /SYS
Are you sure you want to start /SYS (y/n)? y
Starting /SYS
```

Note – The server takes about one minute to power off. Use the `show /HOST` command to determine when the host has been powered off. The console will display `status=Powered Off`.

---

c. Switch to the system console to view POST output.

```
-> start /SYS/console
```

Watch the POST output for possible fault messages. The following output is a sign that POST did not detect any faults:

```
.
.
.
0:0:0>INFO:
0:0:0>     POST Passed all devices.
0:0:0>POST:    Return to VBSC.
0:0:0>Master set ACK for vbsc runpost command and spin...
```

Note – Depending on the configuration of ILOM POST variables and whether POST-detected faults or not, the system might boot, or the system might remain at the `ok` prompt. If the system is at the `ok` prompt, type `boot`.

---

d. Return the virtual keyswitch to Normal mode.

```
-> set /SYS keyswitch_state=Normal
Set 'ketswitch_state' to 'Normal'
```

e. Switch to the system console and issue the Solaris OS `fmadm faulty` command.

```
# fmadm faulty
```

No memory faults should be displayed.

If faults are reported, refer to the diagnostics flowchart in FIGURE: Diagnostic Flowchart on page 11 for an approach to diagnose the fault.

4. **Switch to the ILOM command shell.**
5. **Run the `show faulty` command.**
   - If the fault was detected by the host and the fault information persists, the output will be similar to the following example:

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/MB/CPU0/CMP0/BR0/CH1/D0
```

```
/SP/faultmgmt/0      | timestamp              | Dec 14 22:43:59
/SP/faultmgmt/0/     | sunw-msg-id            | SUN4V-8000-DX
faults/0             |                        |
/SP/faultmgmt/0/     | uuid                   | 3aa7c854-9667-e176-efe5-e487e520
faults/0             |                        | 7a8a
/SP/faultmgmt/0/     | timestamp              | Dec 14 22:43:59
faults/0             |                        |
```

- If the `show faulty` command does not report a fault with a UUID, then you do not need to proceed with the following step because the fault is cleared.

6. **Run the `set` command.**

```
-> set /SYS/MB/CPU0/CMP0/BR0/CH1/D0 clear_fault_action=True
Are you sure you want to clear /SYS/MB/CPU0/CMP0/BR0/CH1/D0 (y/n)? y
Set 'clear_fault_action' to 'true
```

▼ Add FB-DIMMs

If you are upgrading the system with additional FB-DIMMs, use this procedure.

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Read the sections, "Supported FB-DIMM Configurations" on page 110 and "FB-DIMM Device Identifiers" on page 112.
- Power off the server using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69
- "Remove a CMP/Memory Module" on page 99

1. **Unpackage the FB-DIMMs and place them on an antistatic mat.**
2. **Ensure that the ejector tabs are in the open position.**
3. **Line up the FB-DIMM with the connector.**

   Align the FB-DIMM notch with the key in the connector. This ensures that the FB-DIMM is oriented correctly.

4. **Push the FB-DIMM into the connector until the ejector tabs lock the FB-DIMM in place.**

   If the FB-DIMM does not easily seat into the connector, verify that the orientation of the FB-DIMM is correct. If the orientation is reversed, damage to the FB-DIMM might occur.

5. **Repeat** Step 2 **through** Step 4 **until all the FB-DIMMs are installed.**

Next Steps

- "Install a CMP/Memory Module" on page 100
- "Install the Top Cover" on page 150
- "Slide the Server Into the Rack" on page 151
- "Power On the Server" on page 153

Supported FB-DIMM Configurations

Use these FB-DIMM configuration rules to help you plan the memory configuration of your server:

- Each CMP/memory module pair holds 16 industry-standard FB-DIMMs.
- 4 FB-DIMM slots are located on the CMP module
- 12 FB-DIMM slots are located on the memory module.
- All FB-DIMMs in the system must be the same density (same capacity).
- At minimum, Channel 0, FB-DIMM Slot 0 in all branches must be populated.
- In branches populated with more than one FB-DIMM (for example, in 8 and 16 FB-DIMM configurations), FB-DIMMs are addressed in pairs. Each pair must be identical (same part number).
- A replacement FB-DIMM must have the same part number as the other FB-DIMM in its pair. For example, a replacement FB-DIMM in J1201 must have the same part number as the FB-DIMM in J1401, in order to ensure an identical pair.
- If you are unable to obtain a matching FB-DIMM, you must replace both FB-DIMMs in the pair.

Each CMP/memory module pair supports the following configurations:

- 4 FB-DIMMs (Group 1)
- 8 FB-DIMMs (Groups 1 and 2)
- 16 FB-DIMMs (Groups 1, 2, and 3) (fully populated configuration)

FIGURE: Supported FB-DIMM Configurations

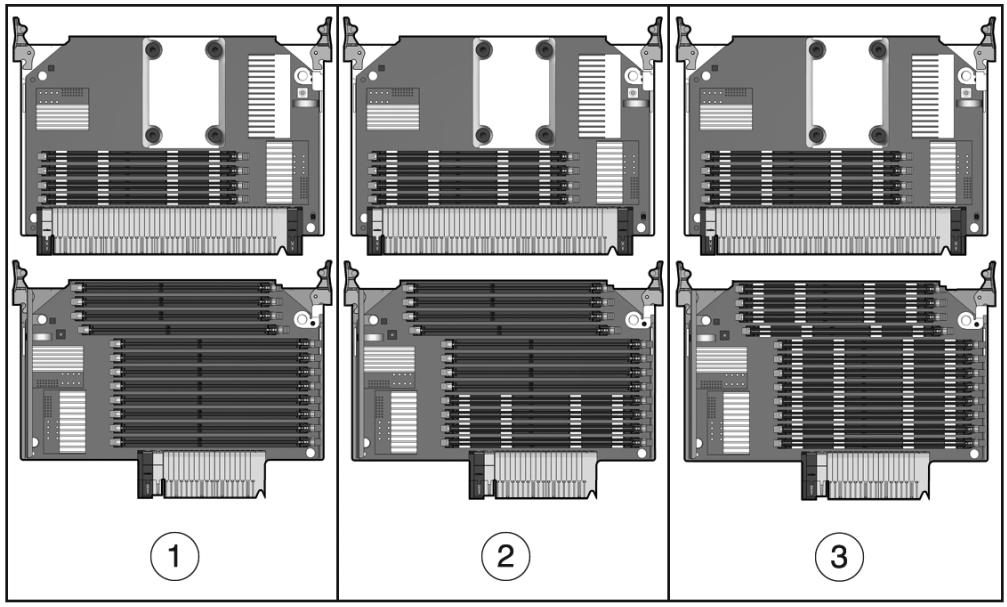


Figure Legend

1	Configuration 1: 4 FB-DIMMs (4 on CMP Module Only)
2	Configuration 2: 8 FB-DIMMs (4 on CMP Module, 4 on Memory Module)
3	Configuration 3: 16 FB-DIMMs (4 on CMP Module, 12 on Memory Module)

Note – See TABLE: FB-DIMM Configurations and Device Identifiers on page 112 for a list of device identifiers and the corresponding slots on the CMP/memory modules.

Related Information

- "Managing Faults" on page 9
- "FB-DIMM Device Identifiers" on page 112
- "FB-DIMM Fault Button Locations" on page 113
- "Performing Node Reconfiguration" on page 155

FB-DIMM Device Identifiers

TABLE: FB-DIMM Configurations and Device Identifiers on page 112 describes device and device identifiers for FB-DIMMs on a CMP and memory module pair. Device identifiers are case-sensitive.

The FB-DIMM address follows the same convention as the CMP or memory module upon which it is mounted. For example, `/SYS/MB/CPU0/CMP0/BR1/CH0/D0` is the device identifier for the FB-DIMM mounted at J792 on CMP module 0.

TABLE: FB-DIMM Configurations and Device Identifiers

Location	FB-DIMM Device Identifiers	Connector Number	FB-DIMM Group
CMP module	/SYS/MB/CPUx/CMPx/BR1/CH0/D0	J792	Group 1*
	/SYS/MB/CPUx/CMPx/BR1/CH1/D0	J896	(4 FB-DIMMs)
	/SYS/MB/CPUx/CMPx/BR0/CH0/D0	J585	
	/SYS/MB/CPUx/CMPx/BR0/CH1/D0	J687	
	Motherboard connector		
Memory module	/SYS/MB/MEMx/CMPx/BR1/CH1/D2	J1471	Group 2
	/SYS/MB/MEMx/CMPx/BR1/CH1/D3	J1573	(4 FB-DIMMs)
	/SYS/MB/MEMx/CMPx/BR1/CH0/D2	J1066	
	/SYS/MB/MEMx/CMPx/BR1/CH0/D3	J1167	
	/SYS/MB/MEMx/CMPx/BR0/CH1/D2	J847	Group 3
	/SYS/MB/MEMx/CMPx/BR0/CH1/D3	J948	(8 FB-DIMMs)
	/SYS/MB/MEMx/CMPx/BR0/CH0/D2	J660	
	/SYS/MB/MEMx/CMPx/BR0/CH0/D3	J762	
	/SYS/MB/MEMx/CMPx/BR0/CH1/D1	J746	
	/SYS/MB/MEMx/CMPx/BR0/CH0/D1	J511	
	/SYS/MB/MEMx/CMPx/BR1/CH0/D1	J927	
	/SYS/MB/MEMx/CMPx/BR1/CH1/D1	J1344	
	Motherboard connector		

* Minimum configuration.

Related Information

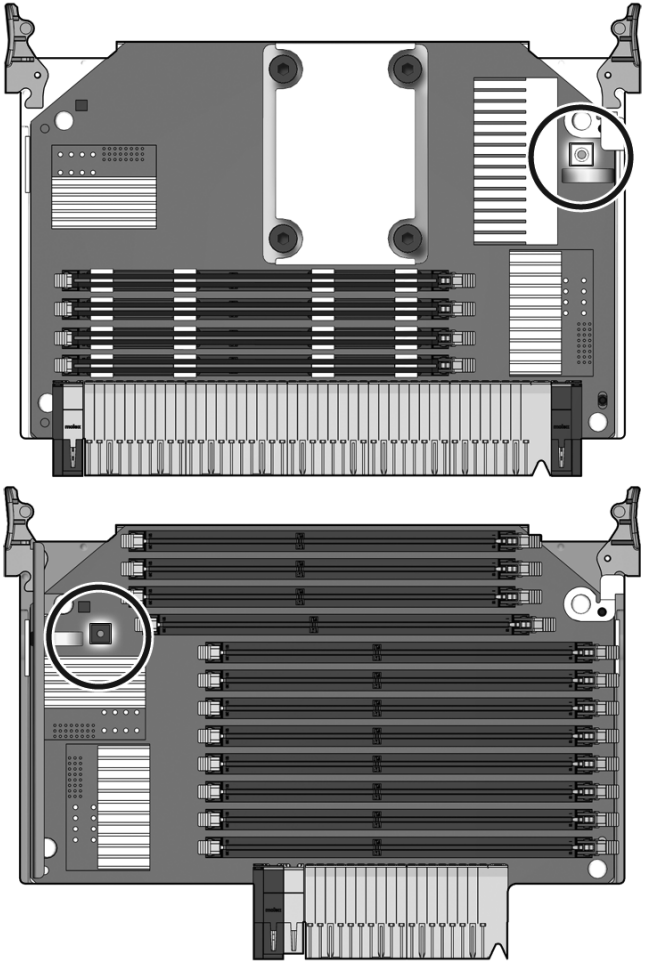
- "Managing Faults" on page 9
- "Supported FB-DIMM Configurations" on page 110
- "FB-DIMM Fault Button Locations" on page 113
- "Performing Node Reconfiguration" on page 155

FB-DIMM Fault Button Locations

FIGURE: FB-DIMM Fault Button Locations on page 114 shows the location of the FB-DIMM fault buttons on the CMP module and the memory module. Press this button to illuminate the fault indicator on the module. Replace the FB-DIMM identified by the indicator.

Note – You must replace a faulty FB-DIMM with an identical part (same part number). See "Supported FB-DIMM Configurations" on page 110 for more information.

FIGURE: FB-DIMM Fault Button Locations



Related Information

- "Managing Faults" on page 9
- "Supported FB-DIMM Configurations" on page 110
- "FB-DIMM Device Identifiers" on page 112

Servicing Field-Replaceable Units

These topics describe how to service field-replaceable units (FRUs) in the SPARC Enterprise T5440 server.

Note – The procedures in this chapter must be performed by a qualified service technician.

Topic	Links
Remove and install field-replaceable components.	"Servicing the Front Bezel" on page 115 "Servicing the DVD-ROM Drive" on page 118 "Servicing the Service Processor" on page 120 "Servicing the IDPROM" on page 123 "Servicing the Battery" on page 125 "Servicing the Power Distribution Board" on page 126 "Servicing the Fan Tray Carriage" on page 129 "Servicing the Hard Drive Backplane" on page 132 "Servicing the Motherboard" on page 135 "Servicing the Flex Cable Assembly" on page 140 "Servicing the Front Control Panel" on page 144 "Servicing the Front I/O Board" on page 146
Exploded views of FRUs	"Field-Replaceable Units" on page 176

Servicing the Front Bezel

You must remove the front bezel in order to service the DVD-ROM drive.

Related Information

- "Servicing the DVD-ROM Drive" on page 118

▼ Remove the Front Bezel

Before you begin, complete these tasks:

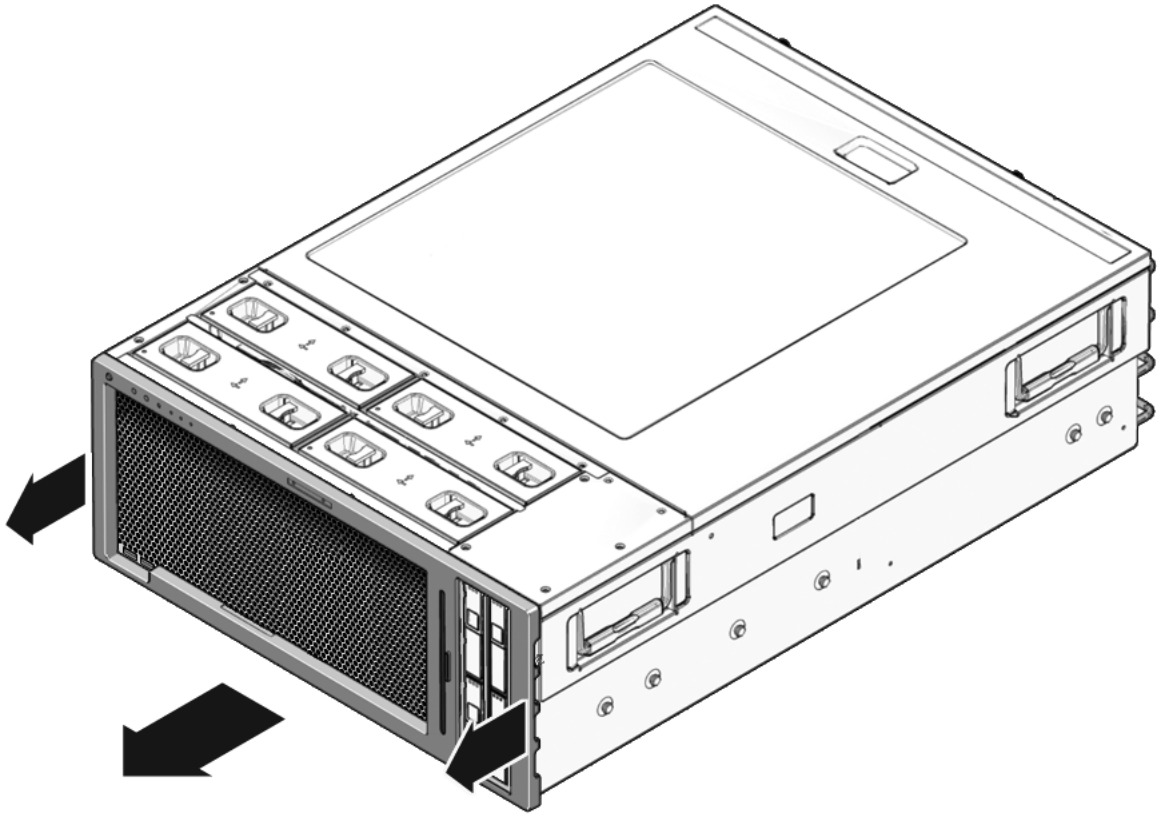
- Read the section, "Safety Information" on page 59.
- If you are performing additional service procedures, power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69

Do the following :

1. **Grasp the front bezel on the left and right sides.**
2. **Pull the bezel off of the front of the chassis.**

   The bezel is secured with three snap-in posts.

FIGURE: Removing the Front Bezel



Note – Avoid bending the bezel by gradually pulling it from the middle and both ends simultaneously.

▼ Install the Front Bezel

1. **Align the bezel with the chassis front panel.**
2. **Press the bezel onto the front panel.**

   The bezel is oriented with four guide pins, and is secured with three snap-in posts.

Next Steps

- "Slide the Server Into the Rack" on page 151

- If you performed any additional service procedures, see "Power On the Server" on page 153.

Servicing the DVD-ROM Drive

You must remove the front bezel before servicing the DVD-ROM drive.

Related Information

- "Servicing the Front Bezel" on page 115

▼ Remove the DVD-ROM Drive

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69
- "Remove the Front Bezel" on page 116

Do the following:

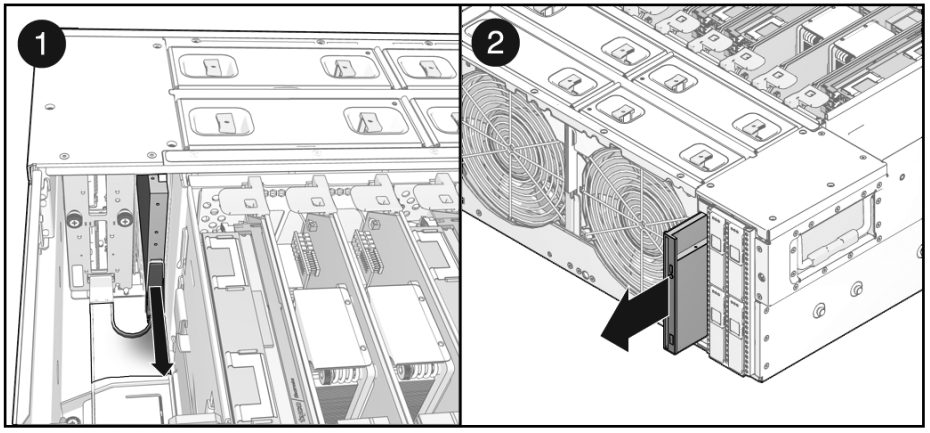
1. **Remove the flex cable retainer.**

   Loosen the captive No. 2 Phillips screw and lift the retainer up and out of the chassis.

2. **Unplug the DVD-ROM drive from the flex cable assembly.**

3. **Push the DVD-ROM drive forward until it protrudes from the front of the chassis.**

FIGURE: Removing the DVD-ROM Drive

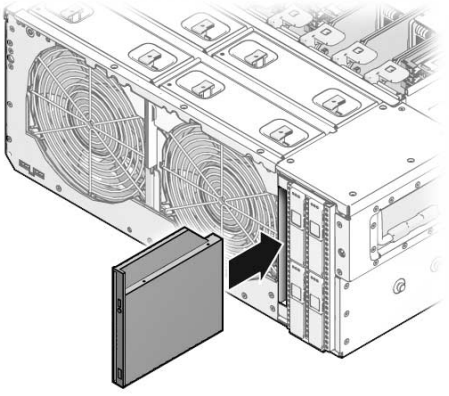


4. **Slide the DVD-ROM drive out of the chassis.**

▼ Install the DVD-ROM Drive

1. **Slide the DVD-ROM drive into its bay.**

FIGURE: Installing the DVD-ROM Drive



2. **Connect the DVD-ROM drive to the flex cable assembly.**
3. **Install the flex cable retainer.**
   Place the retainer into position and tighten the captive No. 2 Phillips screw.

Next Steps

- "Install the Front Bezel" on page 117
- "Install the Top Cover" on page 150
- "Slide the Server Into the Rack" on page 151
- "Power On the Server" on page 153

Servicing the Service Processor

The service processor module contains the service processor firmware, IDPROM, and system battery.

Related Information

- "Servicing the IDPROM" on page 123
- "Servicing the Battery" on page 125

▼ Remove the Service Processor

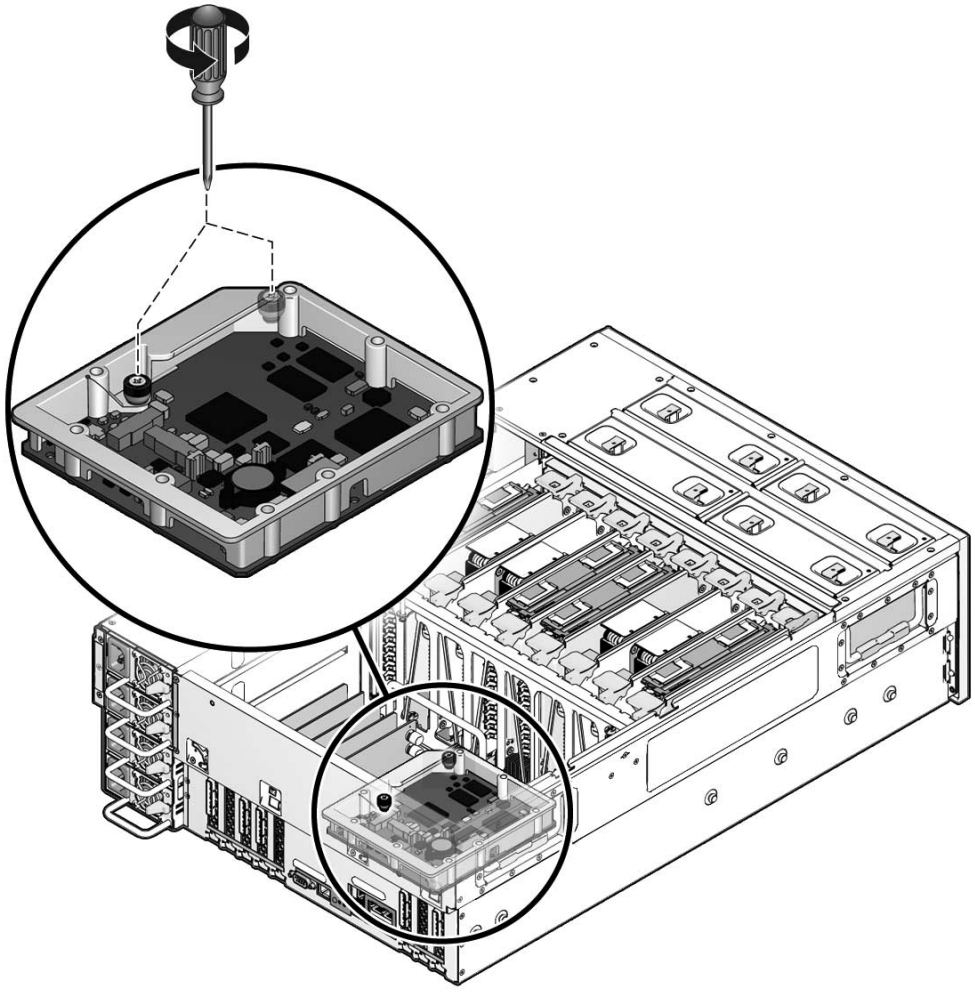
Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Disconnect Power Cords From the Server" on page 65
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69

Do the following:

1. **Ensure that the power cords are disconnected from the server.**
2. **Loosen the two captive No. 2 Phillips screws securing the service processor to the motherboard.**

FIGURE: Removing the Service Processor



3. **Lift the service processor up and out of the system.**
4. **Place the service processor on an antistatic mat.**

Next Steps

If you are replacing a faulty service processor, you must install the IDPROM onto the new service processor. Do the following:

- Remove the IDPROM from the old service processor. See "Remove the IDPROM" on page 123.

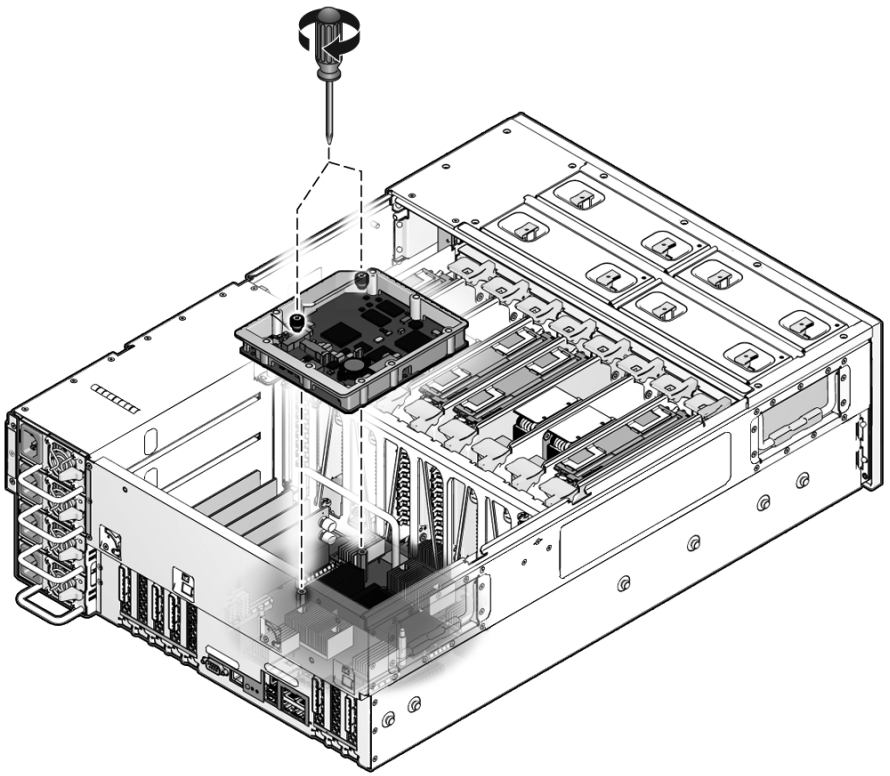
- Install the IDPROM onto the new service processor. See "Install the IDPROM" on page 124.

▼ Install the Service Processor

1. **Ensure that the power cords are disconnected from the system.**
2. **Lower the service processor into position.**

   Ensure that the service processor is oriented correctly over the motherboard connector and the two snap-on standoffs.

FIGURE: Installing the Service Processor



3. **Press down evenly to plug the service processor into the motherboard.**
4. **Secure the service processor with the two captive No.2 Phillips screws.**

Next Steps

- "Install the Top Cover" on page 150
- "Slide the Server Into the Rack" on page 151
- "Connect the Power Cords to the Server" on page 153
- "Power On the Server" on page 153

Servicing the IDPROM

The IDPROM stores system parameters, such as host ID and MAC address, ILOM configuration settings, and OpenBoot PROM configuration settings. If you are replacing a faulty service processor, you must move the IDPROM from the old service processor to the new one.

Related Information

- "Servicing the Service Processor" on page 120
- "Servicing the Battery" on page 125

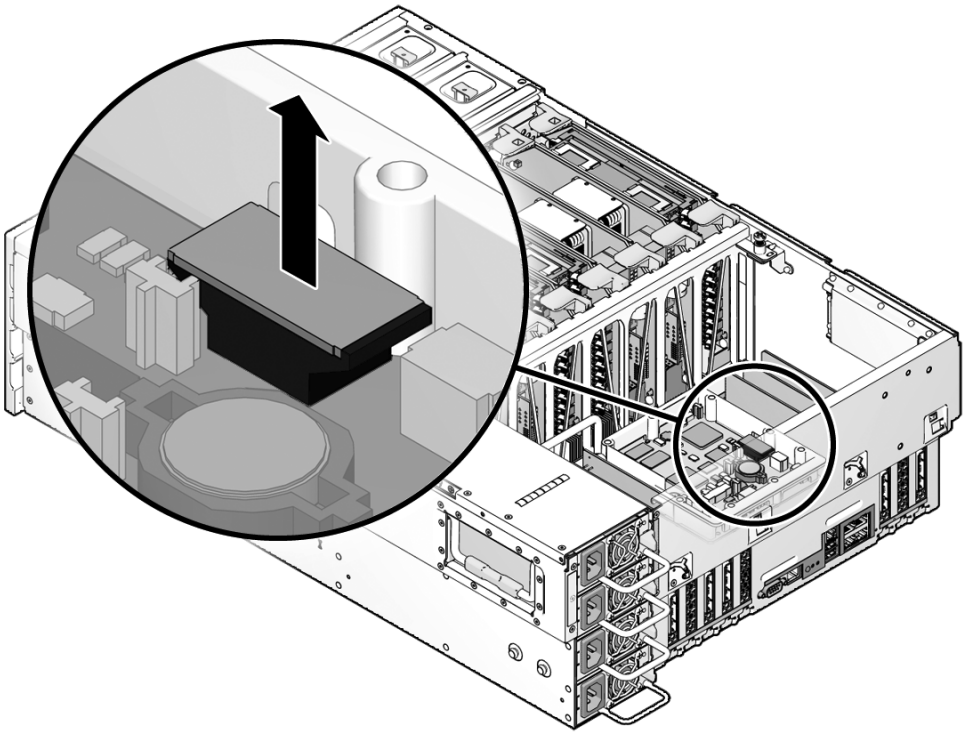
▼ Remove the IDPROM

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Disconnect Power Cords From the Server" on page 65
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69
- "Remove the Service Processor" on page 120

1. **Lift the IDPROM up, off its connector on the service processor.**

FIGURE: Removing the IDPROM



2. **Place the IDPROM on an antistatic mat.**

▼ Install the IDPROM

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Disconnect Power Cords From the Server" on page 65
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69
- "Remove the Service Processor" on page 120

- **Plug the IDPROM into its connector on the service processor.**

  Ensure that the service processor is oriented correctly. A notch on the IDPROM corresponds to a similar notch on the connector.

Servicing the Battery

The battery provides the power necessary to maintain system configuration parameters during power outages, or while the system is being serviced, stored or relocated.

Related Information

- "Servicing the Service Processor" on page 120
- "Servicing the IDPROM" on page 123

▼ Remove the Battery

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Disconnect Power Cords From the Server" on page 65
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69
- "Remove the Service Processor" on page 120

1. **Release the latch securing the battery to its holder on the service processor board.**
2. **Lift the battery up and off the board.**

▼ Install the Battery

1. **Place the battery into its holder on the service processor board.**

   Ensure that the battery is oriented correctly.

2. **Press the battery firmly until it snaps into place.**

Next Steps

- "Install the Service Processor" on page 122
- "Install the Top Cover" on page 150
- "Slide the Server Into the Rack" on page 151
- "Connect the Power Cords to the Server" on page 153
- "Power On the Server" on page 153

Servicing the Power Distribution Board

Main 12V power is connected to the motherboard through a bus bar. Standby power and other control signals are routed through the flex cable circuit to the motherboard.

Related Information

- "Safety Information" on page 59
- "Servicing Power Supplies" on page 85

▼ Remove the Power Distribution Board

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server using one of the methods described in the section, "Powering Off the System" on page 63.
- "Disconnect Power Cords From the Server" on page 65
- "Extend the Server to the Maintenance Position" on page 66
- "Remove a Power Supply" on page 89

Note – You must remove all four power supplies from the system.

- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69

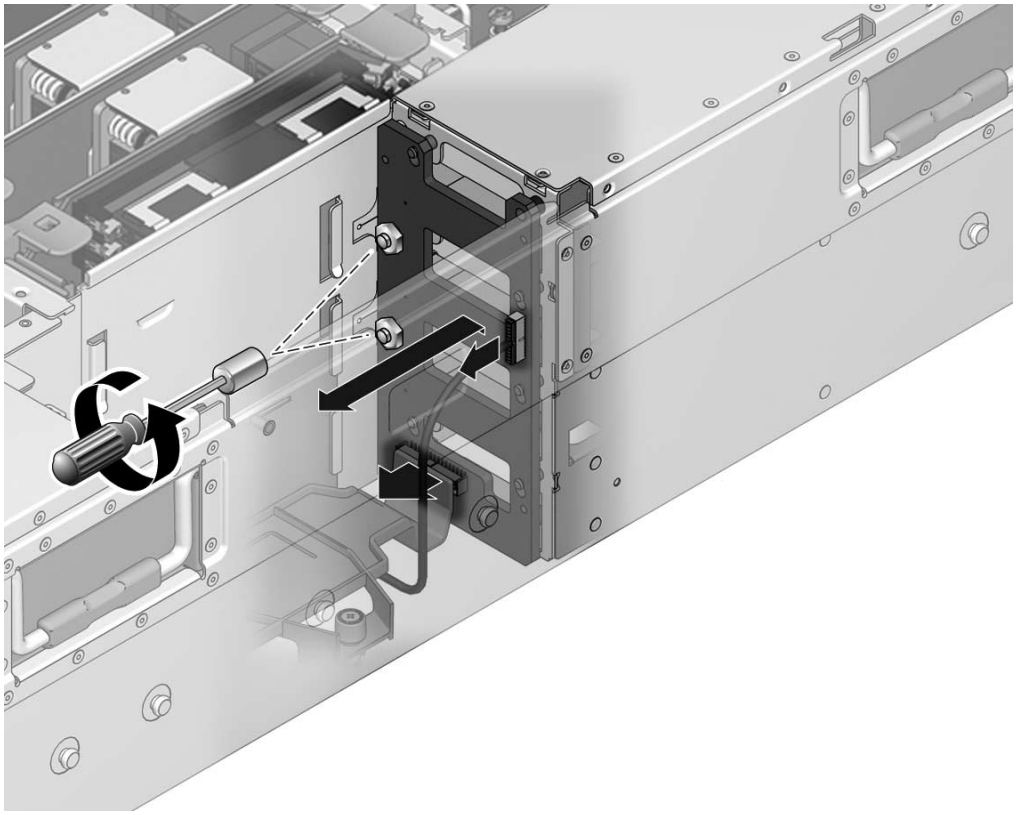
Do the following:

1. **Remove the flex cable retainer.**

   Loosen the captive No. 2 Phillips screw and lift the retainer up and out of the chassis.

2. **Unplug the flex cable from the power distribution board.**
3. **Unplug the auxiliary power cable from the power distribution board.**
4. **Remove the No. 2 Phillips screw.**
5. **Remove the two 7 mm hex nuts securing the bus bars to the power distribution board.**

FIGURE: Disconnecting the Power Distribution Board From the Chassis

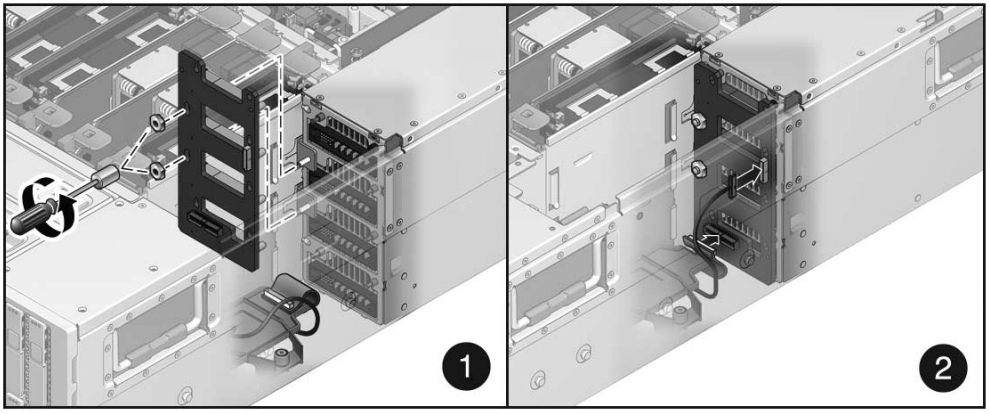


6. **Slide the power distribution board up and out of the chassis.**

▼ Install the Power Distribution Board

1. **Align the keyholes in the power distribution board with the corresponding mushroom standoffs in the chassis.**
2. **Lower the power distribution board into the chassis.**

FIGURE: Installing the Power Distribution Board



3. **Install the No. 2 Phillips screw.**
4. **Install the two 7 mm nuts securing the bus bars to the power distribution board.**
5. **Plug in the flex cable connector.**
   Ensure that the auxilliary power cable is routed under the flex cable connector.
6. **Plug in the auxiliary power cable.**
7. **Install the flex cable retainer.**
   Place the retainer into position and tighten the captive No.2 Phillips screw.

Next Steps

- "Install the Top Cover" on page 150
- "Slide the Server Into the Rack" on page 151
- "Install a Power Supply" on page 90

Note – Install all four power supplies.

- "Connect the Power Cords to the Server" on page 153
- "Power On the Server" on page 153

Servicing the Fan Tray Carriage

You must remove the fan tray carriage in order to service the following components:

- Hard disk backplane
- Motherboard
- Front control panel
- Front I/O board

Related Information

- "Servicing Fan Trays" on page 81
- "Servicing the Hard Drive Backplane" on page 132
- "Servicing the Motherboard" on page 135
- "Servicing the Front Control Panel" on page 144
- "Servicing the Front I/O Board" on page 146

▼ Remove the Fan Tray Carriage

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove a Fan Tray" on page 83

Note – You must remove all four fan trays.

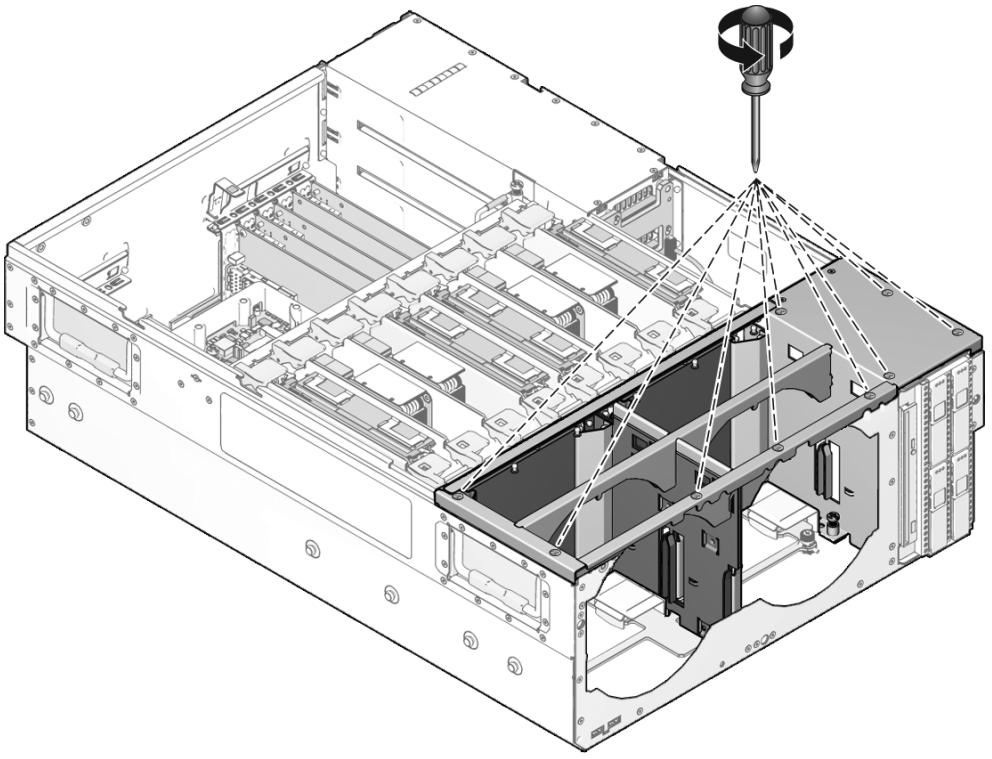
- "Remove the Top Cover" on page 69
- "Remove a CMP/Memory Module" on page 99

Note – You must remove all CPU modules and memory modules from the system.

Do the following:

1. **Remove the nine No. 1 Phillips screws securing the fan tray carriage to the top of the chassis.**

FIGURE: Removing the Fan Tray Carriage

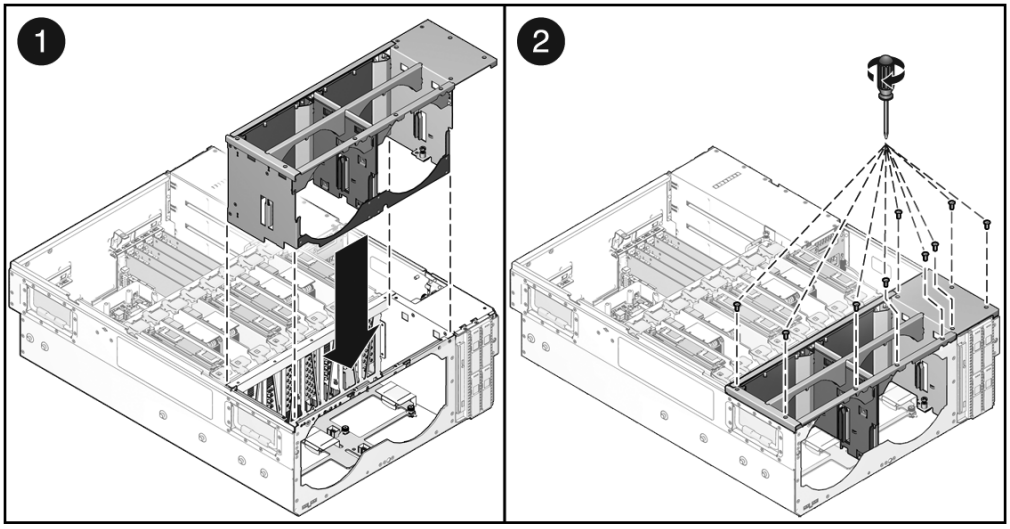


2. **Loosen the seven captive No. 2 Phillips securing the bottom of the fan tray carriage to the motherboard assembly.**
3. **Lift the fan tray carriage up and out of the system.**

▼ Install the Fan Tray Carriage

1. **Lower the fan tray carriage into the system.**

FIGURE: Installing the Fan Tray Carriage



2. **Secure the seven captive No. 2 Phillips screws**
3. **Install the nine No. 1Phillips screws.**

Next Steps

- "Install a Fan Tray" on page 84

Note – Install all four fan trays.

- "Install the Top Cover" on page 150
- "Slide the Server Into the Rack" on page 151
- "Power On the Server" on page 153

Servicing the Hard Drive Backplane

The hard drive backplane provides the power and data interconnect to the internal hard drives.

Related Information

- "Servicing Hard Drives" on page 72

- "Servicing the Fan Tray Carriage" on page 129

▼ Remove the Hard Drive Backplane

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69
- "Remove a Hard Drive" on page 77

Note – You must remove all four hard drives from the server. Note the location of each hard drive you remove. You must re-install each hard drive in the correct bay.

- "Remove a Fan Tray" on page 83

Note – You must remove all four fan trays.

- "Remove the Fan Tray Carriage" on page 129

Do the following:

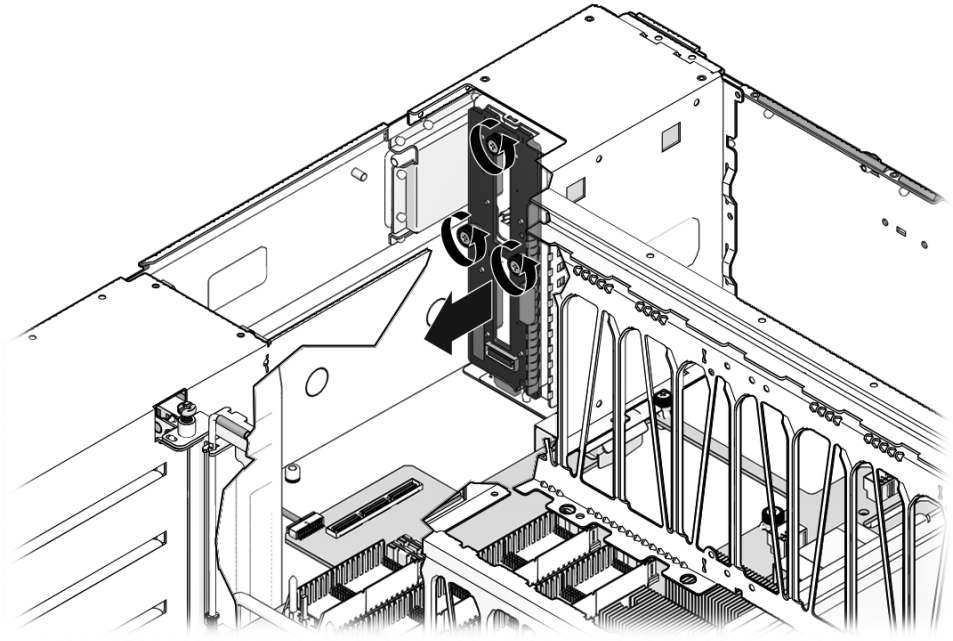
1. **Remove the flex cable retainer.**

   Loosen the captive No.2 Phillips screw and lift the retainer up and out of the chassis.

2. **Unplug the cable from the hard drive backplane.**

3. **Loosen the three captive No. 2 Phillips screws.**

FIGURE: Removing the Hard Drive Backplane



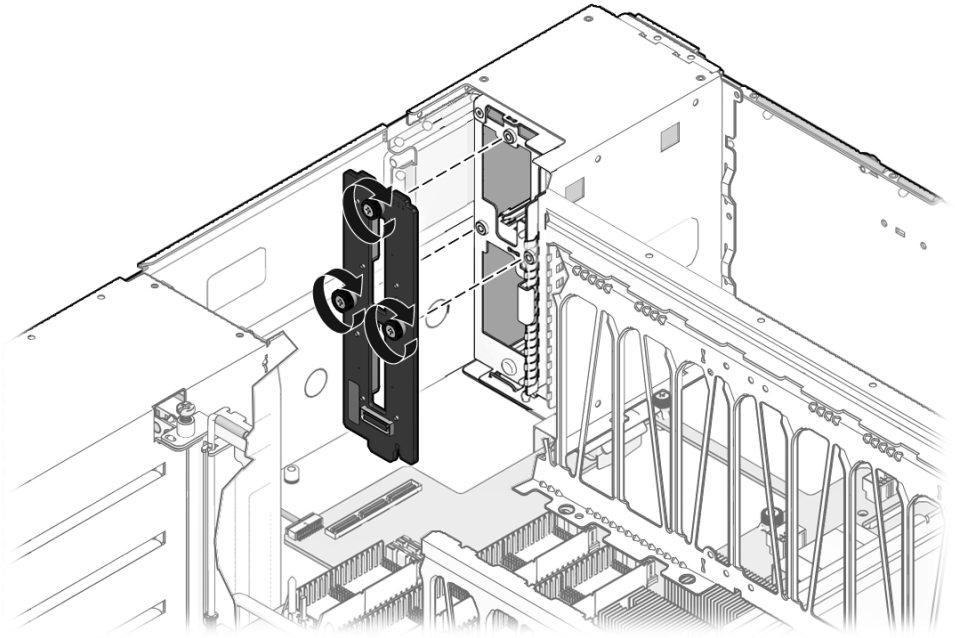
4. **Lift the backplane up and out of the system.**

▼ Install the Hard Drive Backplane

1. **Lower the hard drive backplane into the system.**

   Align the tab on the lower edge the backplane with the corresponding slot in the chassis floor.

FIGURE: Installing the Hard Drive Backplane



2. **Tighten the three captive No. 2 Phillips screws.**
3. **Plug the cable into its connector on the backplane.**
4. **Install the flex cable retainer.**

   Place the retainer into position and tighten the captive No.2 Phillips screw.

Next Steps

- "Install the Fan Tray Carriage" on page 131
- "Install a Fan Tray" on page 84
- "Install a CMP/Memory Module" on page 100
- "Install the Top Cover" on page 150
- "Install a Hard Drive" on page 78

Note – You must install the hard drives in the correct slots.

- "Slide the Server Into the Rack" on page 151
- "Power On the Server" on page 153

Servicing the Motherboard

Note – If you are replacing faulty motherboard, you must set `diag_mode` to `normal` or `off` before performing this procedure.

Related Information

- "Controlling How POST Runs" on page 26
- "Servicing CMP/Memory Modules" on page 98
- "Servicing PCIe Cards" on page 92
- "Servicing the Service Processor" on page 120
- "Servicing the Fan Tray Carriage" on page 129
- "Motherboard Fastener Locations" on page 139

▼ Remove the Motherboard

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Disconnect Power Cords From the Server" on page 65
- "Remove the Server From the Rack" on page 67
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69
- "Remove a PCIe Card" on page 93

Note – You must remove all PCIe cards. Note the location of all PCIe cards so you can install them in the correct slots during reassembly.

- "Remove the Service Processor" on page 120
- "Remove a CMP/Memory Module" on page 99

Note – You must remove all CMP and memory modules.

- "Remove a Fan Tray" on page 83

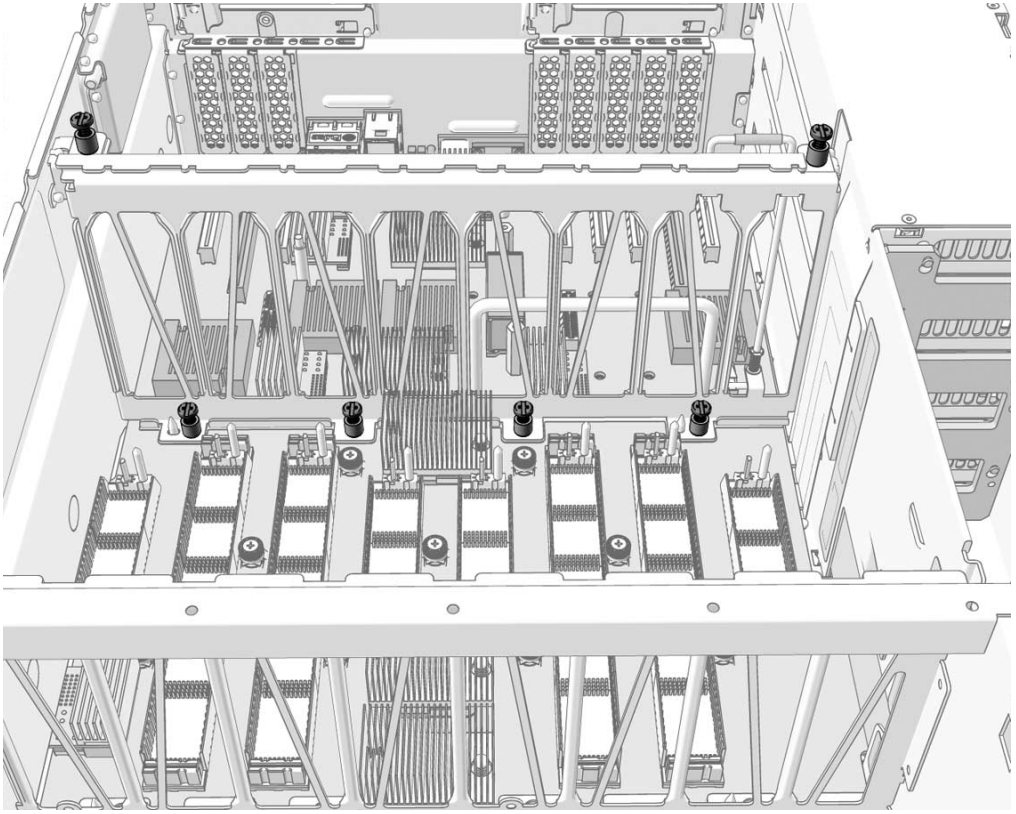
Note – You must remove all four fan trays.

- "Remove the Fan Tray Carriage" on page 129

1. **Remove the CMP/memory module bracket.**

   The bracket is secured with six captive No. 2 Phillips screws. See FIGURE: CMP/Memory Module Bracket Captive Screw Locations on page 136.

FIGURE: CMP/Memory Module Bracket Captive Screw Locations



2. **Remove the flex cable retainer.**

   Loosen the captive No.2 Phillips screw and lift the retainer up and out of the chassis.

3. **Unplug the flex cable from J9801 on the motherboard.**

4. **Unplug the auxiliary power cable from J9803 on the motherboard.**

5. **Unplug the front I/O connector from J9901 on the motherboard.**
6. **Remove the six No. 2 Phillips screws that secure the bus bar assembly to the motherboard.**
7. **Slide the chassis midwall panel up.**

Note – Use the clips to secure the midwall panel in the open position.

---

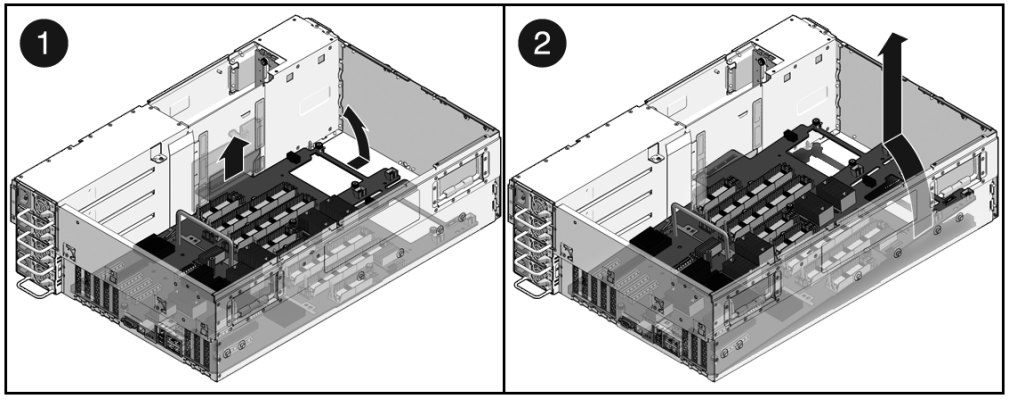
8. **Loosen the No. 2 Phillips screws that secure the motherboard to the chassis floor.**

   See FIGURE: Motherboard Fastener Locations on page 140 for the fastener locations.

9. **Lift the motherboard up and out of the chassis.**

   Guide the flex cable connector out from under the midwall partition.

FIGURE: Removing the Motherboard



10. **Place the motherboard on an antistatic mat.**

Next Steps

If you are replacing a faulty motherboard, you must program the chassis serial number and product part number into the new motherboard. See your service representative.

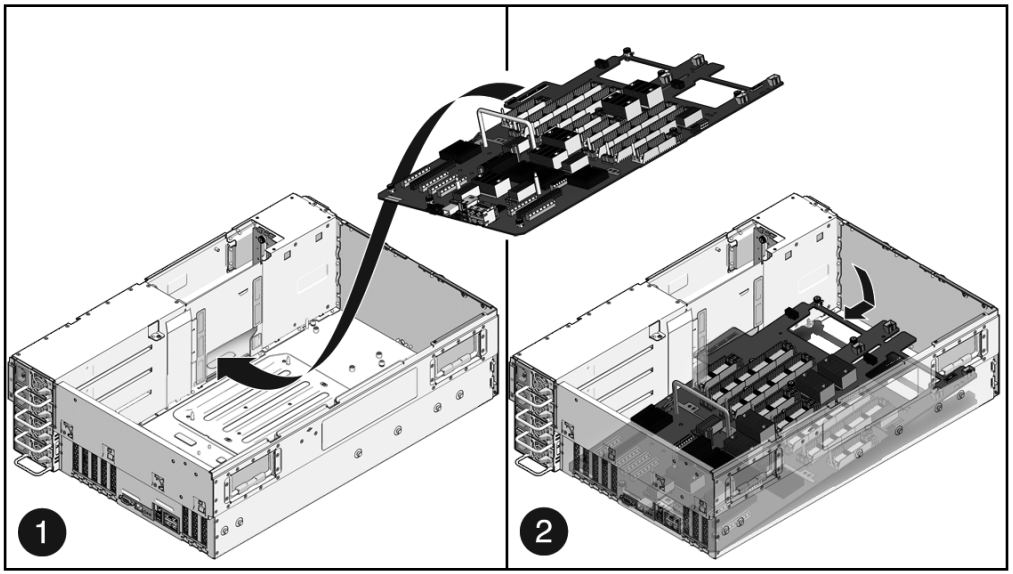
▼ Install the Motherboard

1. **Ensure that all 14 captive screws in the motherboard are retracted.**

2. **Lower the motherboard down into the chassis.**

   Guide the flex cable connector through the midwall partition.

FIGURE: Installing the Motherboard



3. **Secure the No. 2 captive Phillips screws.**

   Ensure that all fasteners are secured. (See FIGURE: Motherboard Fastener Locations on page 140.)

4. **Lower and secure the midwall partition.**

5. **Install the six No. 2 Phillips screws that secure the bus bar assembly to the motherboard.**

6. **Install the CMP/memory module bracket.**

   The bracket is secured with six No. 2 Phillips screws.

7. **Plug in the auxiliary power cable to J9803.**

8. **Plug in the flex cable connector to J9801.**

9. **Install the flex cable retainer.**

   Place the retainer into position and tighten the captive No. 2 Phillips screw.

10. **Plug in the front I/O cable to J9901.**

Next Steps

- "Install the Fan Tray Carriage" on page 131
- "Install a Fan Tray" on page 84

Note – Install all four fan trays.

- "Install a CMP/Memory Module" on page 100

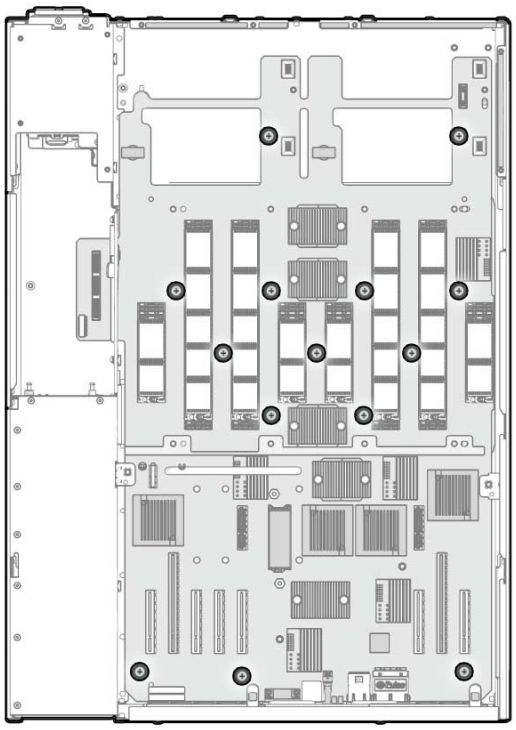
Note – Install all CMP and memory modules.

- "Install the Service Processor" on page 122
- "Install a PCIe Card" on page 94
- "Install the Top Cover" on page 150
- "Install the Server Into the Rack" on page 150
- "Connect the Power Cords to the Server" on page 153
- "Power On the Server" on page 153

Motherboard Fastener Locations

FIGURE: Motherboard Fastener Locations on page 140 shows the location of the captive screws that secure the motherboard to the chassis floor.

FIGURE: Motherboard Fastener Locations



Related Information

- "Servicing the Motherboard" on page 135

Servicing the Flex Cable Assembly

The flex cable assembly provides the power and data connection between the power supply backplane, hard drive backplane, and motherboard.

Related Information

- "Safety Information" on page 59
- "Servicing Power Supplies" on page 85

- "Servicing the Power Distribution Board" on page 126
- "Servicing the Hard Drive Backplane" on page 132
- "Servicing the Motherboard" on page 135

▼ Remove the Flex Cable Assembly

Before you begin, complete these tasks:

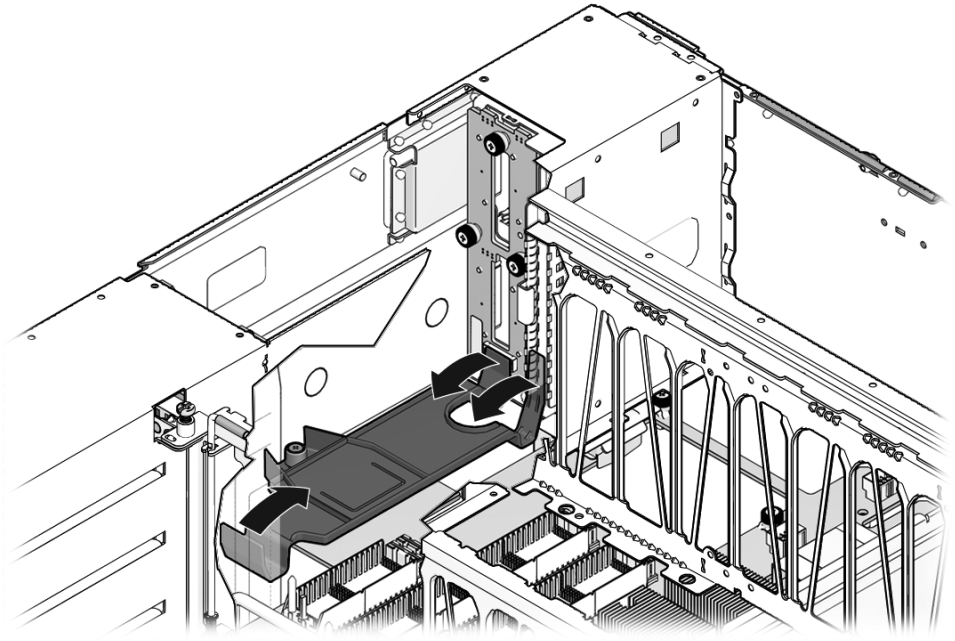
- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Extend the Server to the Maintenance Position" on page 66
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69

Do the following:

1. **Unplug the power cords.**
2. **Remove the flex cable retainer.**

   Loosen the captive No.2 Phillips screw and lift the retainer up and out of the chassis.

FIGURE: Removing the Flex Cable Retainer



3. **Unplug the flex cable-to-power supply backplane connection.**
4. **Unplug the flex cable-to-hard drive backplane connection.**
5. **Unplug the flex cable-to-DVD-ROM drive connection.**
6. **Unplug the flex cable-to-motherboard connection.**
7. **Lift the flex cable up and out of the system.**

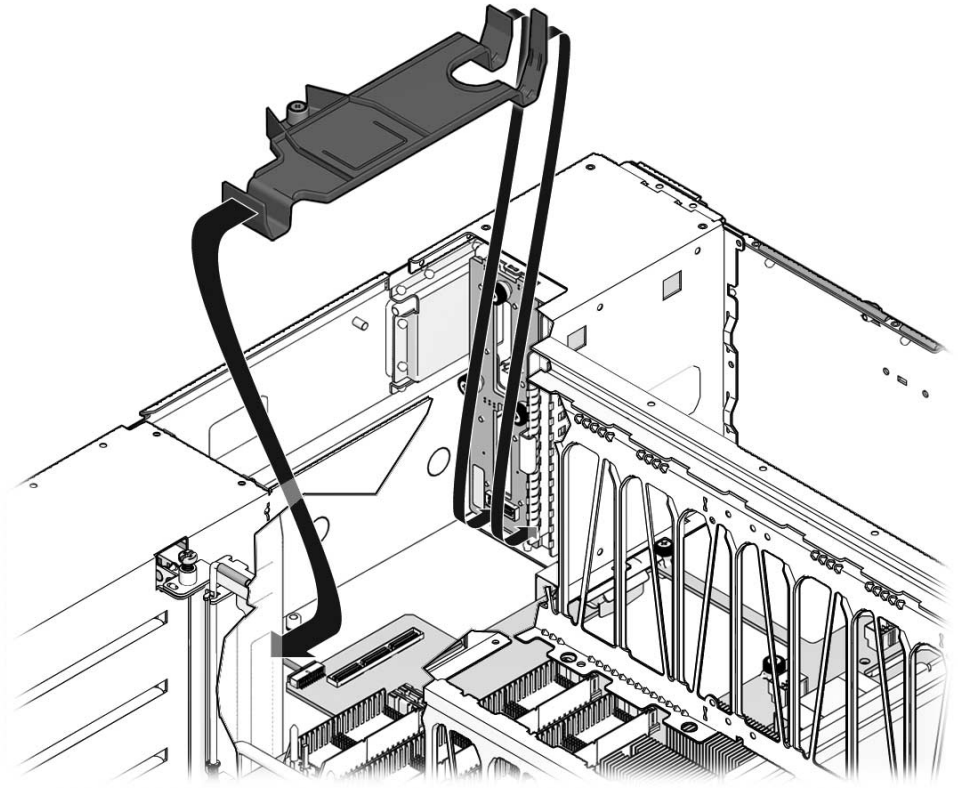
▼ Install the Flex Cable Assembly

1. **Ensure the power cables are unplugged.**
2. **Plug in the motherboard connector.**
3. **Plug in the hard drive backplane connector.**
4. **Plug in the DVD-ROM drive connector.**
5. **Plug in the power supply backplane connector.**

6. **Install the flex cable retainer.**

   Place the retainer into position and tighten the captive No. 2 Phillips screw.

FIGURE: Installing the Flex Cable Retainer



7. **Plug in the power cables.**

Next Steps

- "Install the Top Cover" on page 150
- "Slide the Server Into the Rack" on page 151
- "Power On the Server" on page 153

Servicing the Front Control Panel

The front control panel contains system status LEDs and the Power button.

Related Information

- "Infrastructure Boards and Cables" on page 1
- "Front Panel Diagram" on page 3
- "Front Panel LEDs" on page 4

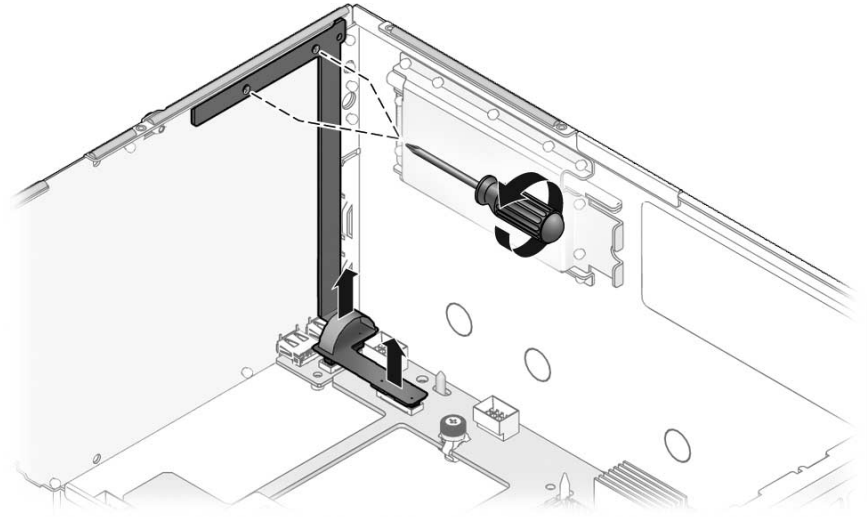
▼ Remove the Front Control Panel

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Disconnect Power Cords From the Server" on page 65
- "Remove the Server From the Rack" on page 67
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69
- "Remove a Fan Tray" on page 83
- "Remove the Fan Tray Carriage" on page 129

1. **Unplug the front control panel cable from J9901 on the motherboard.**
2. **Unplug the front control panel cable from the front I/O board.**
3. **Remove the two No. 2 Phillips screws.**

FIGURE: Removing the Front Control Panel

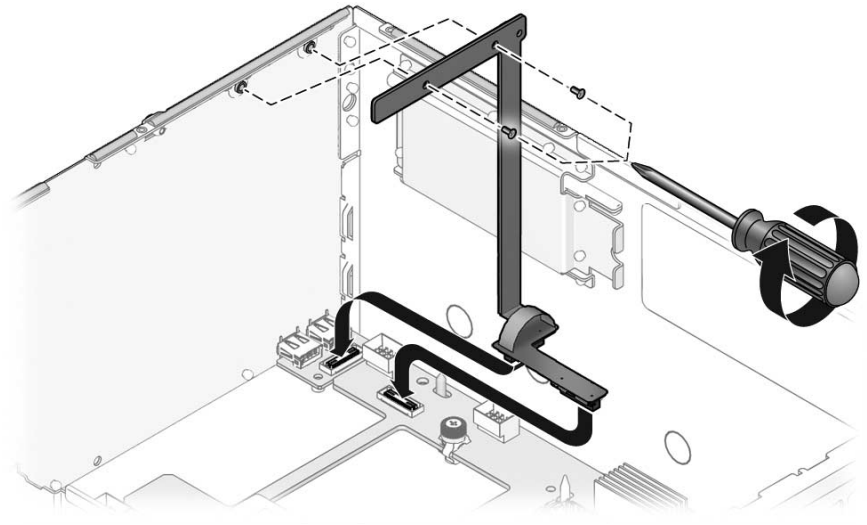


4. **Lift the front control panel up and out of the system.**
5. **Place the front control panel on an antistatic mat.**

▼ Install the Front Control Panel

1. **Lower the front control panel into the system.**

FIGURE: Installing the Front Control Panel



2. **Install the two No. 2 Phillips screws.**
3. **Plug the front control panel connector into the front I/O board.**
4. **Plug the front control panel connector into J9901 on the motherboard.**

Next Steps

- "Install the Fan Tray Carriage" on page 131
- "Install a Fan Tray" on page 84
- "Install the Top Cover" on page 150
- "Install the Server Into the Rack" on page 150
- "Connect the Power Cords to the Server" on page 153
- "Power On the Server" on page 153

Servicing the Front I/O Board

The front I/O board contains two USB connectors. You must remove the front control panel to service the front I/O board.

Related Information

- "Infrastructure Boards and Cables" on page 1
- "Front Panel Diagram" on page 3
- "Servicing the Front Control Panel" on page 144

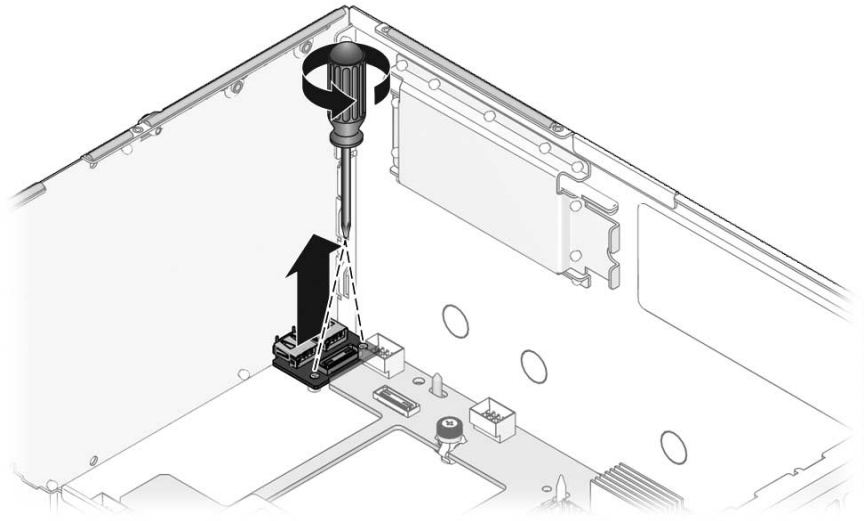
▼ Remove the Front I/O Board

Before you begin, complete these tasks:

- Read the section, "Safety Information" on page 59.
- Power off the server, using one of the methods described in the section, "Powering Off the System" on page 63.
- "Disconnect Power Cords From the Server" on page 65
- "Remove the Server From the Rack" on page 67
- "Perform Electrostatic Discharge – Antistatic Prevention Measures" on page 69
- "Remove the Top Cover" on page 69
- "Remove a Fan Tray" on page 83
- "Remove the Fan Tray Carriage" on page 129

1. **Unplug the front control panel cable from J9901 on the motherboard.**
2. **Unplug the front control panel cable from the front I/O board.**
3. **Remove the two No. 2 Phillips screws.**

FIGURE: Removing the Front I/O Board



4. **Lift the front I/O board up and out of the system.**
5. **Place the front I/O board on an antistatic mat.**

▼ Install the Front I/O Board

1. **Lower the front I/O board into the system.**
2. **Install the two No. 2 Phillips screws.**
3. **Plug the front control panel connector into the front I/O board.**
4. **Plug the front control panel connector into J9901 on the motherboard.**

Next Steps

- "Install the Fan Tray Carriage" on page 131
- "Install a Fan Tray" on page 84
- "Install the Top Cover" on page 150
- "Install the Server Into the Rack" on page 150
- "Connect the Power Cords to the Server" on page 153
- "Power On the Server" on page 153

Returning the Server to Operation

These topics describe how to return the SPARC Enterprise T5440 and SPARC Enterprise T5440 servers to operation after you have performed service procedures.

Caution – Never attempt to run the server with the cover removed. Hazardous voltage is present.

Caution – Equipment damage could occur if you run the server with the cover removed. The cover must be in place for proper air flow.

Topic	Links
Install the top cover after servicing internal components.	"Install the Top Cover" on page 150
Re-attach the server to the cabinet slide rails after performing a bench procedure.	"Install the Server Into the Rack" on page 150
Slide the server back into the equipment rack.	"Slide the Server Into the Rack" on page 151
Re-attach power cords and data cables to the back panel of the server.	"Connect the Power Cords to the Server" on page 153
Power on the server after performing a service procedure.	"Power On the Server" on page 153

Related Information

- "Preparing to Service the System" on page 59
- "Servicing Customer-Replaceable Units" on page 71
- "Servicing Field-Replaceable Units" on page 115

▼ Install the Top Cover

If you removed the top cover, perform the steps in this procedure.

Note – If removing the top cover caused an emergency shutdown, you must install the top cover and use the `poweron` command to restart the system. See "Power On the Server" on page 153.

---

1. **Place the top cover on the chassis.**

   Set the cover down so that it hangs over the rear of the server by about an inch (25.4 mm).

2. **Slide the top cover forward until it seats.**

3. **Secure the top cover by tightening the two captive screws along the rear edge.**

▼ Install the Server Into the Rack

The following procedure explains how to insert the server into the rack.

Caution – The weight of the server on extended slide rails can be enough to overturn an equipment rack. Before you begin, deploy the antitilt feature on your cabinet.

Caution – The server weighs approximately 88 lb (40 kg). Two people are required to lift and mount the server into a rack enclosure when using the procedures in this chapter.

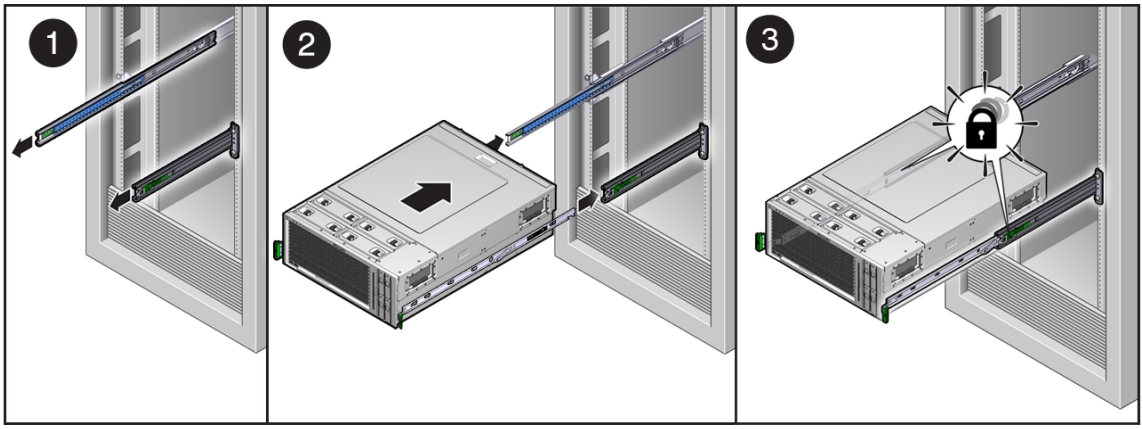
---

1. **Slide the inner slide assemblies out from the outer rails about 2 inches (5 cm) from the front face of the rail's bracket.**

   The inner slide assemblies should be locked past the internal stop. See FIGURE: Inserting the System Into the Rack on page 151.

   Ensure that the ball bearing retainer is locked all the way forward.

FIGURE: Inserting the System Into the Rack



2. **Lift the server up and insert the inner rails into the inner slide assemblies.**

   Ensure that the inner rails are horizontal when the inner rails enter the inner slide assemblies.

3. **Ensure that the inner rails are engaged with the ball-bearing retainers on both inner slide assemblies.**

Note – If necessary, support the server with the mechanical lift while aligning the inner rails parallel to the rack-mounted inner slide assemblies.

▼ Slide the Server Into the Rack

1. **Press the inner rail release buttons (**FIGURE: Slide Rail Release Button Location on page 152**) on both sides of the server.**

FIGURE: Slide Rail Release Button Location

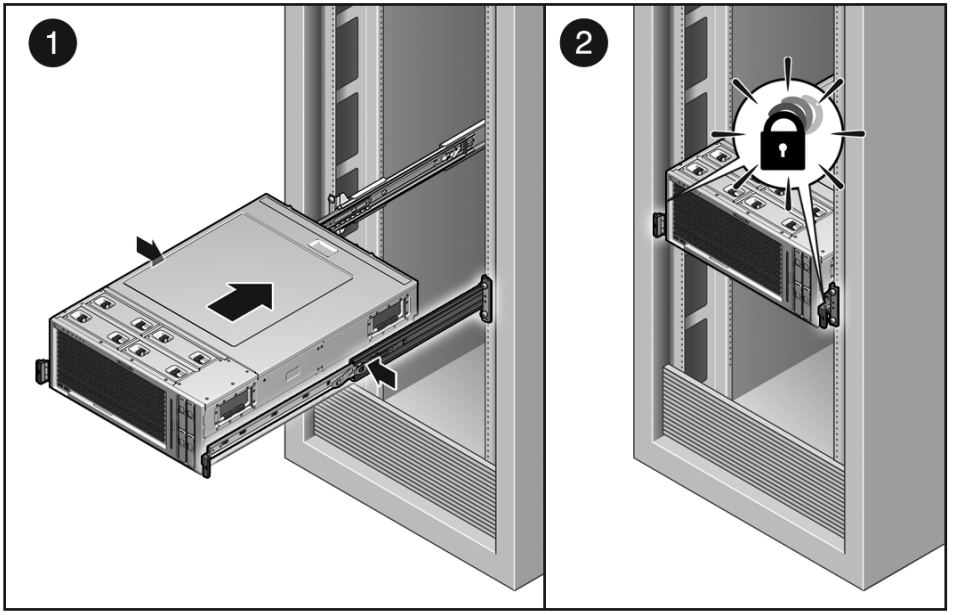


Figure Legend

1	Inner rail release button
2	Slide rail lock

2. **While pushing on the release buttons, slowly push the server into the rack.**

   Ensure that the cables do not get in the way.

3. **If necessary, re-attach the CMA.**

   a. **Attach the CMA support strut to the inner glide.**

   b. **Attach the CMA to the inner glide.**

      Slide the hinge plate into the end of the outer rail until the retaining pin snaps into place.

4. **Reconnect the cables to the back of the server.**

   If the CMA is in the way, slide the server partially out of the cabinet to access the necessary rear panel connections.

▼ Connect the Power Cords to the Server

- **Reconnect both power cords to the power supplies.**

Note – As soon as the power cords are connected, standby power is applied. Depending on the configuration of the firmware, the system might boot. See the *SPARC Enterprise T5440 Server Administration Guide* for configuration and power-on information.

▼ Power On the Server

- **To power on the server, do one of the following:**
  - To initiate the power-on sequence from the service processor prompt, issue the `poweron` command.
  - You will see an `-> Alert` message on the system console. This message indicates that the system is reset. You will also see a message indicating that the VCORE has been margined up to the value specified in the `default.scr` file that was previously configured.
  - Example:

```
-> start /SYS
```

  - To initiate the power-on sequence manually, use a pen or pencil to press the Power button on the front panel. See "Front Panel Diagram" on page 3 for Power button location.

Note – If you are powering on the server following an emergency shutdown triggered by the top cover interlock switch, you must use the `poweron` command.

Performing Node Reconfiguration

If a CMP/memory module pair develops a fault, the SPARC Enterprise T5440 can be reconfigured to run in a degraded state until the CMP/memory module is replaced. In addition, you can add CMP/memory module pairs to existing systems. However, adding or removing CMP/memory modules might affect internal hardware device addresses, as well as the device address of any external devices attached to the system such as external disk arrays and devices attached via an External I/O Expansion Unit.

Depending on which CMP/memory module is added or removed, it might be necessary to manually reassign one or more I/O devices before they can function correctly in the new system configuration.

Topic	Links
Learn about how CMP/memory modules map to I/O devices.	"I/O Connections to CMP/Memory Modules" on page 156
Learn how to reconfigure the server to temporarily bypass a failed CMP/memory module	"Reconfiguring I/O Device Nodes" on page 158
Disable memory modules	"Temporarily Disable All Memory Modules" on page 160
Reconfigure I/O and PCIe fabric	"Reconfigure the I/O and PCIe Fabric" on page 158
Re-enable memory modules to work in a new I/O and PCIe configuration	"Re-Enable All Memory Modules" on page 161
Reset logical domain guest configuration	"Reset the LDoms Guest Configuration" on page 162
Reference for system bus topology	"System Bus Topology" on page 162
Reference for I/O fabric in supported configurations	"I/O Fabric in 2P Configuration" on page 164 "I/O Fabric in 4P Configuration" on page 165

Related Information

- "Managing Faults" on page 9

- "Servicing PCIe Cards" on page 92
- "Servicing CMP/Memory Modules" on page 98
- "Servicing FB-DIMMs" on page 104

I/O Connections to CMP/Memory Modules

Each PCIe slot and onboard I/O device is connected to one CMP module. Device address is dependent on system configuration. See TABLE: Devices controlled by CMPs in 2P systems on page 164 and TABLE: Devices controlled by CMPs in 4P systems on page 165 for more information.

If a CMP module fails, the onboard devices and slots directly connected to it become unavailable. Recovery of the I/O services connected to the failed CMP requires I/O node reconfiguration.

For example, in a 4P system, if CMP0 goes offline, the following devices become unavailable:

- PCIe0
- PCIe1
- Onboard hard drives

In this failure scenario, the system is unable to boot from internal drives.

Similarly, if CMP1 goes offline, the following devices become unavailable:

- PCIe4
- PCIe5
- Onboard network devices

Related Information

- "System Bus Topology" on page 162
- "I/O Fabric in 2P Configuration" on page 164
- "I/O Fabric in 4P Configuration" on page 165

Recovering from a Failed CMP/Memory Module

If your system experiences a complete CMP/memory module failure, do one of the following:

1. Replace the failed CMP/memory module.
2. If a replacement CMP module is not available, remove the failed CMP module and replace it with a CMP from a different slot that does not have any directly connected I/O devices in use (see TABLE: Devices controlled by CMPs in 2P systems on page 164 andTABLE: Devices controlled by CMPs in 4P systems on page 165). If this leaves a memory module without its associated CMP module, remove the memory module.

Note – At a minimum, a functioning CMP module must be installed in CMP Slot 0. If you are performing a node reconfiguration following a failure in CMP Slot 0, you must move one of the remaining CMP modules to CMP Slot 0.

---

3. If neither option (1) nor (2) is possible, you must do the following:
   - "Temporarily Disable All Memory Modules" on page 160
   - "Reconfigure the I/O and PCIe Fabric" on page 158
   - "Re-Enable All Memory Modules" on page 161
   - "Reset the LDoms Guest Configuration" on page 162

Related Information

- "Managing Faults" on page 9
- "Servicing CMP/Memory Modules" on page 98
- "Servicing FB-DIMMs" on page 104
- "I/O Connections to CMP/Memory Modules" on page 156
- "Reconfiguring I/O Device Nodes" on page 158
- "System Bus Topology" on page 162
- "I/O Fabric in 2P Configuration" on page 164
- "I/O Fabric in 4P Configuration" on page 165

Reconfiguring I/O Device Nodes

You might need to change the connection between the CMP modules and the onboard devices described in TABLE: Devices controlled by CMPs in 2P systems on page 164 or TABLE: Devices controlled by CMPs in 4P systems on page 165 in one of the following circumstances:

- A CMP module has completely failed, you need access to a PCIe slot or device which was attached to that CMP module, and you are unable to temporarily replace the failed module or move an existing module over from a different slot until the failed CMP is replaced.
- You are upgrading from a 2P to a 4P system.

Related Information

- "Managing Faults" on page 9
- "I/O Connections to CMP/Memory Modules" on page 156
- "System Bus Topology" on page 162
- "I/O Fabric in 2P Configuration" on page 164
- "I/O Fabric in 4P Configuration" on page 165
- "Temporarily Disable All Memory Modules" on page 160
- "Reconfigure the I/O and PCIe Fabric" on page 158
- "Re-Enable All Memory Modules" on page 161
- "Reset the LDoms Guest Configuration" on page 162

▼ Reconfigure the I/O and PCIe Fabric

The `reconf.pl` script reconfigures the PCIe fabric to reconnect the PCIe slots and onboard devices to the CMP nodes as efficiently as possible. The `reconf.pl` script also reconfigures the Solaris device names to match the new connections between the CMP modules and the PCIe devices and slots. Use the `reconf.pl` script to reattach each PCIe slot and onboard device to its nearest available CMP module.

To use the `reconf.pl`, you must have the following:

- Solaris OS JumpStart™ server
- Net install image
- The `reconf.pl` script

Do the following:

1. **Download the `reconf.pl` script, available at:**

   (https://cds.sun.com/is-bin/INTERSHOP.enfinity/WFS/CDS-CDS_SMI-Site/en_US/-/USD/ViewProductDetail-Start?ProductRef=IORSC-SP-E54440SV-G-F@CDS-CDS_SMI)

2. **Copy the `reconf.pl` script to the root directory of the "miniroot" of the netinstall image. This is the `Solaris_10/Tools/Boot` directory of your exported Solaris 10 8/07, Solaris 10 5/08, or Solaris 10 10/08 OS image on your JumpStart server.**

3. **Power off the system.**

4. **Log into the ALOM compatibility shell. Type:**

```
sc> setsc sys_ioreconfigure nextboot
```

5. **Power on the system.**

6. **Boot from the network. Type:**

```
ok boot -s
```

7. **Mount the system boot disk under the `/mnt` directory. Type:**

```
# mount /dev/dsk/c0t0d0s0 /mnt
```

8. **Change to the root directory of your boot disk and copy the `reconf.pl` script to the root of the boot disk. Type:**

```
# cd /mnt
```

9. **Do one of the following:**

   - If your Jumpstart server is exporting Solaris 10 8/07 or Solaris 10 5/08, type:

```
# cp /reconf.pl .
```

   - If your Jumpstart server is exporting Solaris 10 10/08, type:

```
# cp /cdrom/Solaris_10/Tools/Boot/reconf.pl .
```

10. **Run the `reconf.pl` script. Type:**

```
# /mnt/reconf.pl
```

11. **Halt the system. Type:**

```
# halt
```

12. **Power off the system. For example, to power off using the ALOM compatibility shell, type:**

```
sc> poweroff
```

    Wait for the console message which indicates that the system has been powered off.

▼ Temporarily Disable All Memory Modules

A disabled CMP node complicates the memory topology and can prevent a system from booting. To run the system in a degraded state, you must reduce the total amount of system memory by disabling all of the FB-DIMMs on all of the memory modules in order to work around this complication.

If you are recovering from a failed CMP module, you must temporarily disable the FB-DIMMS on all memory modules when Solaris is halted and the system is powered off. The FB-DIMMs are re-enabled after the I/O and PCIe devices are reconfigured.

You can either physically remove the memory modules from the system, or remotely disable all FB-DIMMs located on all memory modules using the `disablecomponent` command.

To remove the memory modules from the system, see the instructions in the *SPARC Enterprise T5440 Server Service Manual*.

To remotely disable all FB-DIMMs in the system, do the following:

1. **Halt the Solaris OS.**

2. **Power off the system.**

3. **Disable each FB-DIMM.**

```
sc> disablecomponent /SYS/MB/MEMx/CMPx/BR0/CH0/D1
sc> disablecomponent /SYS/MB/MEMx/CMPx/BR0/CH0/D2
...
sc> disablecomponent /SYS/MB/MEMx/CMPx/BR1/CH1/D3
```

where *x* is the memory module to be disabled.

CODE EXAMPLE: Using the `disablecomponent` command to disable all FB-DIMMs on MEM1 on page 161 shows how to disable all the FB-DIMMs on MEM1.

CODE EXAMPLE: Using the `disablecomponent` command to disable all FB-DIMMs on MEM1

```
sc> disablecomponent /SYS/MB/MEM1/CMP1/BR0/CH0/D1
sc> disablecomponent /SYS/MB/MEM1/CMP1/BR0/CH0/D2
sc> disablecomponent /SYS/MB/MEM1/CMP1/BR0/CH0/D3
sc> disablecomponent /SYS/MB/MEM1/CMP1/BR0/CH1/D1
sc> disablecomponent /SYS/MB/MEM1/CMP1/BR0/CH1/D2
sc> disablecomponent /SYS/MB/MEM1/CMP1/BR0/CH1/D3
sc> disablecomponent /SYS/MB/MEM1/CMP1/BR1/CH0/D1
sc> disablecomponent /SYS/MB/MEM1/CMP1/BR1/CH0/D2
sc> disablecomponent /SYS/MB/MEM1/CMP1/BR1/CH0/D3
sc> disablecomponent /SYS/MB/MEM1/CMP1/BR1/CH1/D1
sc> disablecomponent /SYS/MB/MEM1/CMP1/BR1/CH1/D2
sc> disablecomponent /SYS/MB/MEM1/CMP1/BR1/CH1/D3
```

▼ Re-Enable All Memory Modules

Now that the connection between the CMP modules and the I/O devices has been reestablished, you can re-enable the FB-DIMMS that were temporarily disabled in "Temporarily Disable All Memory Modules" on page 160.

- **Do one of the following:**
  - Install the memory modules if you removed them.
  - Re-enable all of the FB-DIMMs which you previously disabled, using the `enablecomponent` command.

```
sc> enablecomponent /SYS/MB/MEMx/CMPx/BR0/CH0/D1
sc> enablecomponent /SYS/MB/MEMx/CMPx/BR0/CH0/D2
...
sc> enablecomponent /SYS/MB/MEMx/CMPx/BR1/CH1/D3
```

where *x* is the CMP/memory module to be enabled.

CODE EXAMPLE: Using the enablecomponent command to enable all FB-DIMMs on CMP1 on page 162 shows how to enable all the FB-DIMMs on MEM1.

CODE EXAMPLE: Using the `enablecomponent` command to enable all FB-DIMMs on CMP1

```
sc> enablecomponent /SYS/MB/MEM1/CMP1/BR0/CH0/D1
sc> enablecomponent /SYS/MB/MEM1/CMP1/BR0/CH0/D2
sc> enablecomponent /SYS/MB/MEM1/CMP1/BR0/CH0/D3
sc> enablecomponent /SYS/MB/MEM1/CMP1/BR0/CH1/D1
sc> enablecomponent /SYS/MB/MEM1/CMP1/BR0/CH1/D2
sc> enablecomponent /SYS/MB/MEM1/CMP1/BR0/CH1/D3
sc> enablecomponent /SYS/MB/MEM1/CMP1/BR1/CH0/D1
sc> enablecomponent /SYS/MB/MEM1/CMP1/BR1/CH0/D2
sc> enablecomponent /SYS/MB/MEM1/CMP1/BR1/CH0/D3
sc> enablecomponent /SYS/MB/MEM1/CMP1/BR1/CH1/D1
sc> enablecomponent /SYS/MB/MEM1/CMP1/BR1/CH1/D2
sc> enablecomponent /SYS/MB/MEM1/CMP1/BR1/CH1/D3
```

▼ Reset the LDoms Guest Configuration

After reconfiguring the I/O and PCIe fabric, you must recreate your LDoms guest configurations, as hardware resources that had been previously assigned to your guests might no longer be available.

1. **Power off the system.**
2. **In the ALOM compatibility shell, type:**

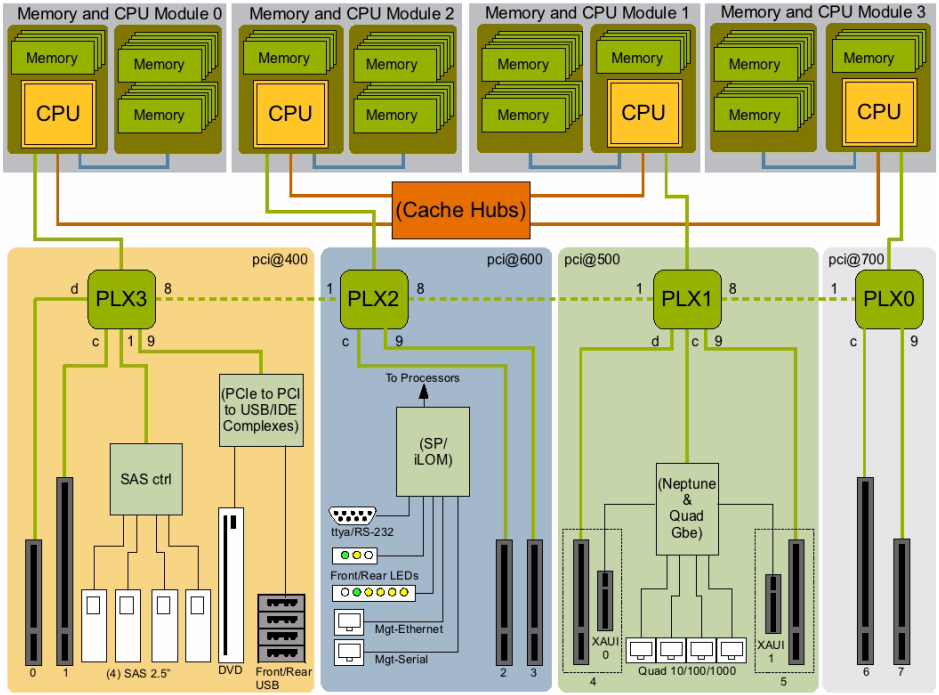
```
sc> bootmode config="factory-default"
```

3. **Power on the system.**
4. **Recreate your LDoms guests using the remaining hardware resources.**

System Bus Topology

FIGURE: System Bus Topology on page 163 describes the system bus topology for the SPARC Enterprise T5440 server.

FIGURE: System Bus Topology



Related Information

- "I/O Fabric in 2P Configuration" on page 164
- "I/O Fabric in 4P Configuration" on page 165

I/O Fabric in 2P Configuration

TABLE: Devices controlled by CMPs in 2P systems

CMP Number	Devices Controlled
CMP0	Onboard disk drives Onboard USB ports Onboard DVD drive PCIe0 PCIe1 PCIe2 PCIe3
CMP1	Onboard Gbit or 10-Gbit network PCIe4 PCIe5 PCIe6 PCIe7

Related Information

- "System Bus Topology" on page 162
- "I/O Fabric in 4P Configuration" on page 165

I/O Fabric in 4P Configuration

TABLE: Devices controlled by CMPs in 4P systems

CMP Number	Devices Controlled
CMP0	Onboard disk drives Onboard USB ports Onboard DVD drive PCIe0 PCIe1
CMP1	Onboard Gbit or 10-Gbit network PCIe4 PCIe5
CMP2	PCIe2 PCIe3
CMP3	PCIe6 PCIe7

Related Information

- "System Bus Topology" on page 162
- "I/O Fabric in 2P Configuration" on page 164

Connector Pinouts

This section provides reference information about the system back panel ports and pin assignments.

Topic	Links
Reference for system connector pinouts	“Serial Management Port Connector Pinouts” on page 167 “Network Management Port Connector Pinouts” on page 168 “Serial Port Connector Pinouts” on page 169 “USB Connector Pinouts” on page 169 “Gigabit Ethernet Connector Pinouts” on page 170

Related Information

- “Identifying Server Components” on page 1

Serial Management Port Connector Pinouts

The serial management connector (labeled SERIAL MGT) is an RJ-45 connector located on the back panel. This port is the default connection to the system console.

FIGURE: Serial Management Connector Diagram

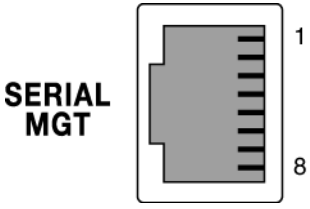


TABLE: Serial Management Connector Signals

Pin	Signal Description	Pin	Signal Description
1	Request to Send	5	Ground
2	Data Terminal Ready	6	Receive Data
3	Transmit Data	7	Data Set Ready
4	Ground	8	Clear to Send

Network Management Port Connector Pinouts

The network management connector (labeled NET MGT) is an RJ-45 connector located on the motherboard and can be accessed from the back panel. This port needs to be configured prior to use.

FIGURE: Network Management Connector Diagram

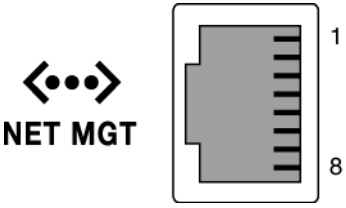


TABLE: Network Management Connector Signals

Pin	Signal Description	Pin	Signal Description
1	Transmit Data +	5	Common Mode Termination
2	Transmit Data –	6	Receive Data –
3	Receive Data +	7	Common Mode Termination
4	Common Mode Termination	8	Common Mode Termination

Serial Port Connector Pinouts

The serial port connector (TTYA) is a DB-9 connector that can be accessed from the back panel.

FIGURE: Serial Port Connector Diagram

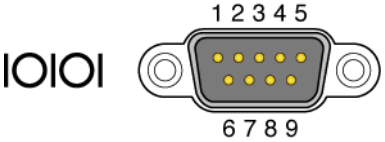


TABLE: Serial Port Connector Signals

Pin	Signal Description	Pin	Signal Description
1	Data Carrier Detect	6	Data Set Ready
2	Receive Data	7	Request to Send
3	Transmit Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicate
5	Ground		

USB Connector Pinouts

Two Universal Serial Bus (USB) ports are located on the motherboard in a double-stacked layout and can be accessed from the back panel. Two additional USB ports are located on the front panel.

FIGURE: USB Connector Diagram

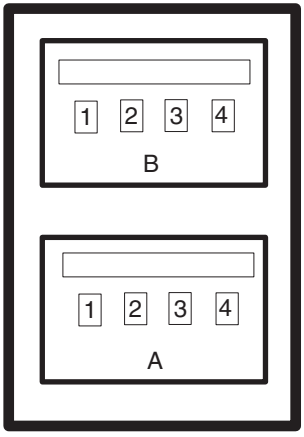


TABLE: USB Connector Signals

Pin	Signal Description	Pin	Signal Description
A1	+5 V (fused)	B1	+5 V (fused)
A2	USB0/1-	B2	USB2/3-
A3	USB0/1+	B3	USB2/3+
A4	Ground	B4	Ground

Gigabit Ethernet Connector Pinouts

Four RJ-45 Gigabit Ethernet connectors (NET0, NET1, NET2, NET3) are located on the system motherboard and can be accessed from the back panel. The Ethernet interfaces operate at 10 Mbit/sec, 100 Mbit/sec, and 1000 Mbit/sec.

FIGURE: Gigabit Ethernet Connector Diagram

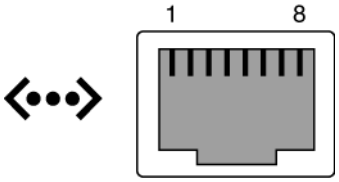


TABLE: Gigabit Ethernet Connector Signals

Pin	Signal Description	Pin	Signal Description
1	Transmit/Receive Data 0 +	5	Transmit/Receive Data 2 –
2	Transmit/Receive Data 0 –	6	Transmit/Receive Data 1 –
3	Transmit/Receive Data 1 +	7	Transmit/Receive Data 3 +
4	Transmit/Receive Data 2 +	8	Transmit/Receive Data 3 –

Server Components

This section provides illustrations depicting system components.

Description	Links
A diagram and list of customer replaceable units (CRUs)	"Customer-Replaceable Units" on page 174
A diagram and list of components that only field service personnel can replace.	"Field-Replaceable Units" on page 176

Related Information

- "Identifying Server Components" on page 1
- "Servicing Customer-Replaceable Units" on page 71
- "Servicing Field-Replaceable Units" on page 115

Customer-Replaceable Units

FIGURE: Customer-Replaceable Units (CRUs)

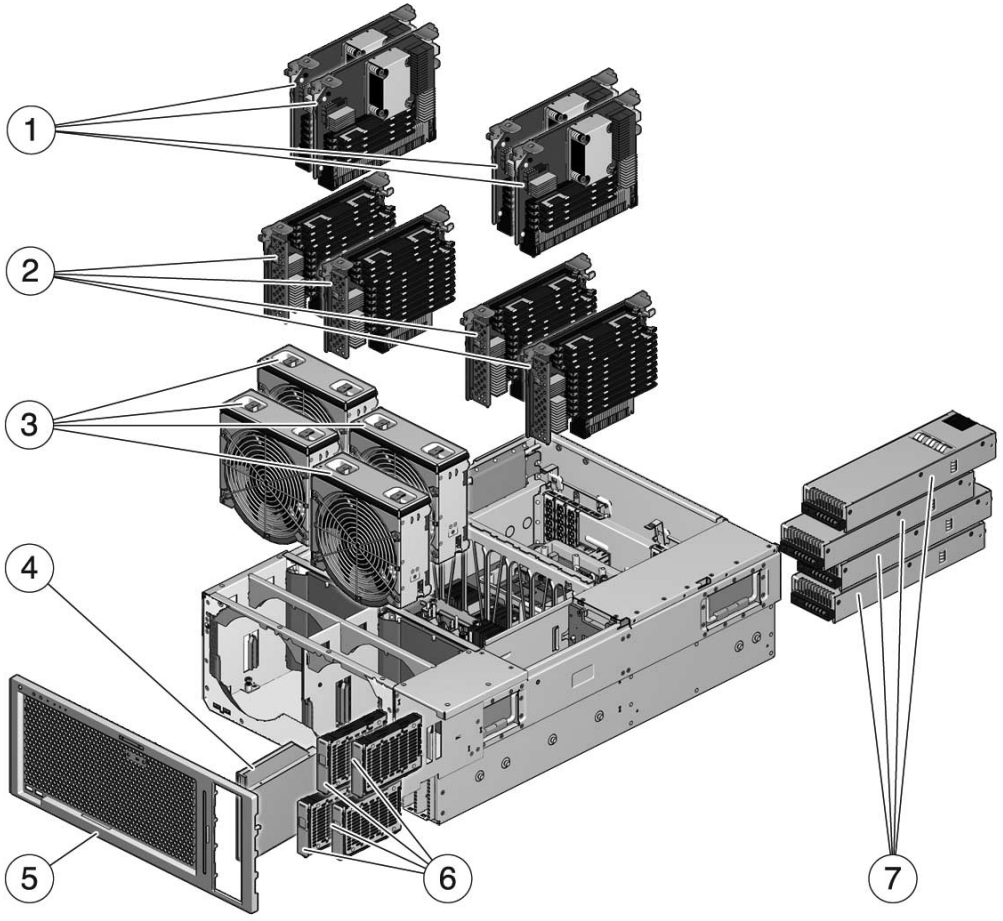


Figure Legend

1	CMP modules	**5**	Front bezel
2	Memory modules	**6**	Hard drives
3	Fan trays	**7**	Power supplies
4	Removable media drive	**8**	

Related Information

- “Hot-Pluggable and Hot-Swappable Devices” on page 72
- “Servicing Hard Drives” on page 72
- “Servicing Fan Trays” on page 81
- “Servicing Power Supplies” on page 85
- “Servicing CMP/Memory Modules” on page 98
- “Servicing FB-DIMMs” on page 104
- “Servicing the Front Bezel” on page 115
- “Servicing the DVD-ROM Drive” on page 118

Field-Replaceable Units

FIGURE: Field-Replaceable Units (FRUs)

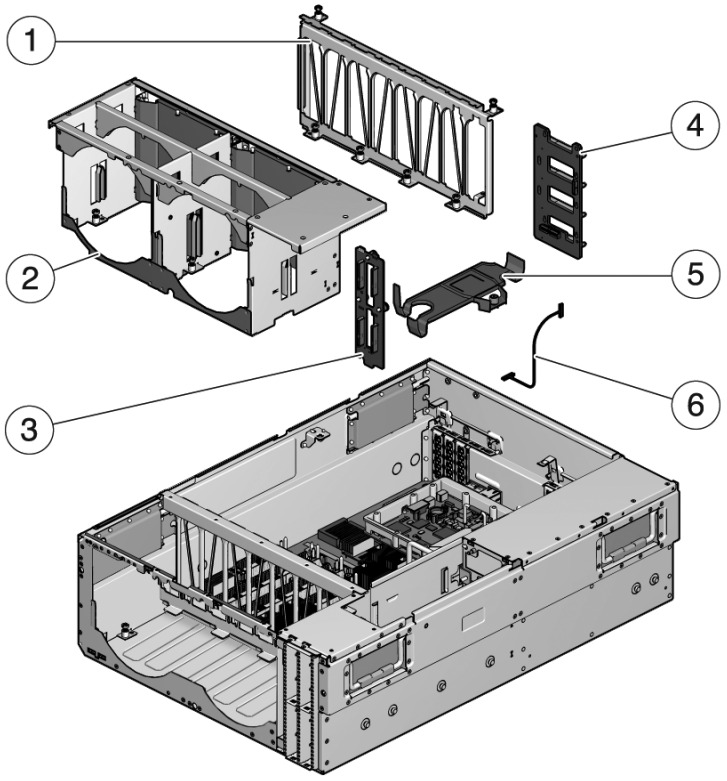


Figure Legend

1	CMP/memory module bracket	**4**	Power supply backplane
2	Fan cage	**5**	Flex cable assembly
3	Hard drive backplane	**6**	Auxiliary power cable

FIGURE: Field Replaceable Units (FRUs) (Motherboard and Auxiliary Boards)

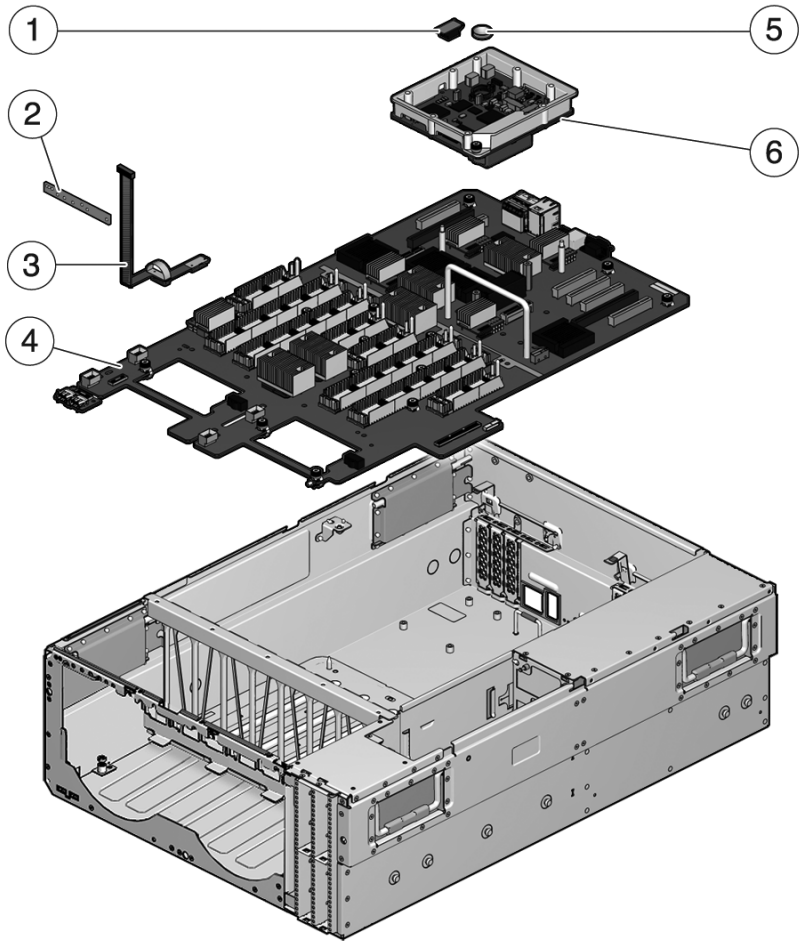


Figure Legend

1	IDPROM	**4**	Motherboard
2	Front Control Panel	**5**	Battery
3	Front I/O Board	**6**	Service Processor

Related Information

- "Servicing the Service Processor" on page 120
- "Servicing the IDPROM" on page 123
- "Servicing the Battery" on page 125
- "Servicing the Power Distribution Board" on page 126

- "Servicing the Fan Tray Carriage" on page 129
- "Servicing the Hard Drive Backplane" on page 132
- "Servicing the Motherboard" on page 135
- "Servicing the Flex Cable Assembly" on page 140
- "Servicing the Front Control Panel" on page 144
- "Servicing the Front I/O Board" on page 146

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